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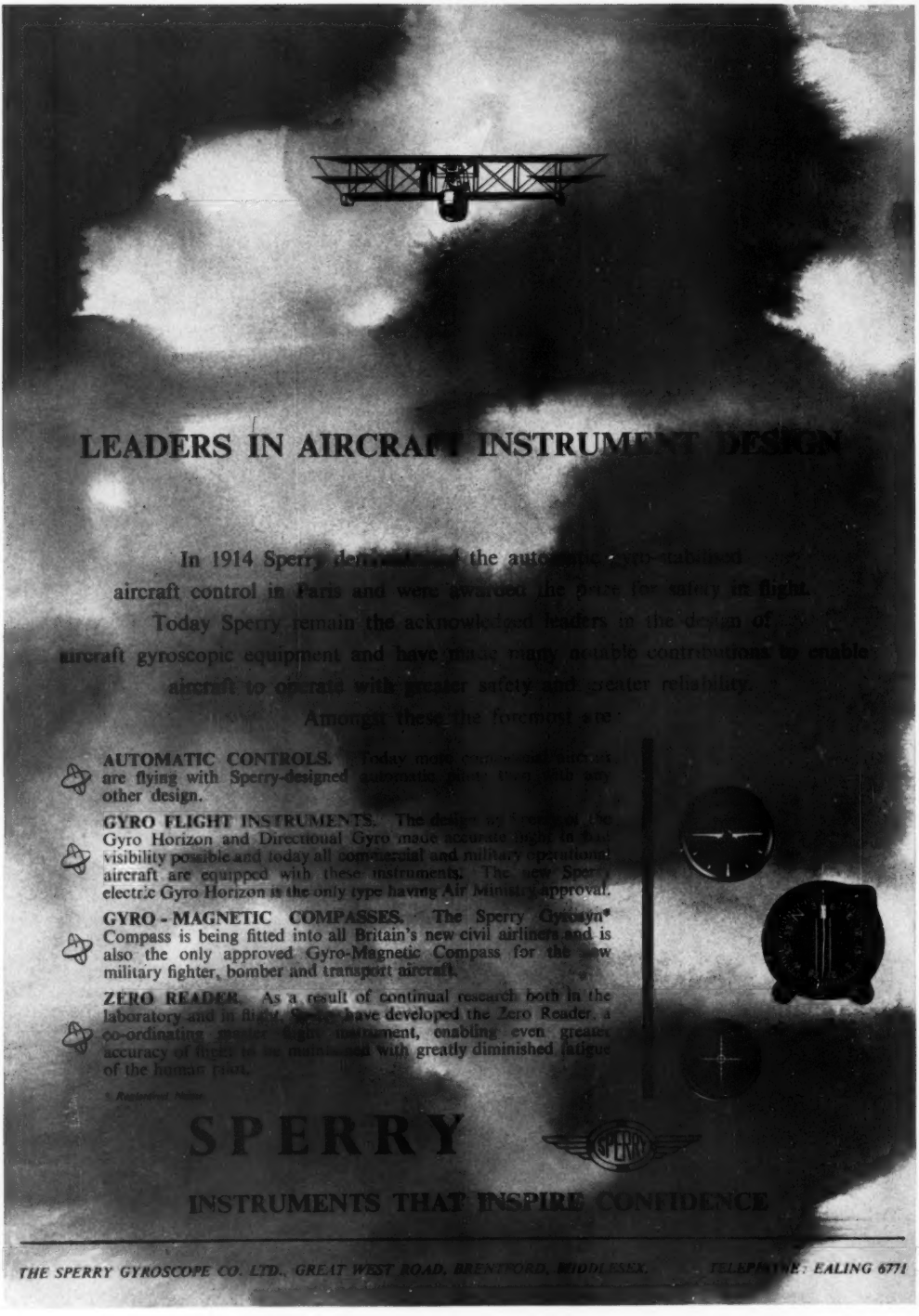

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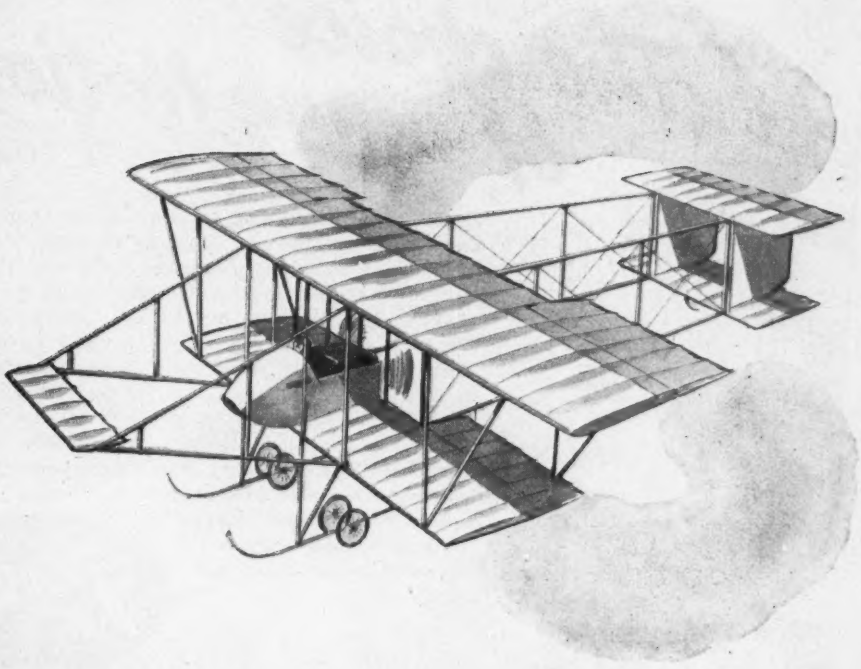

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Golden Jubilee

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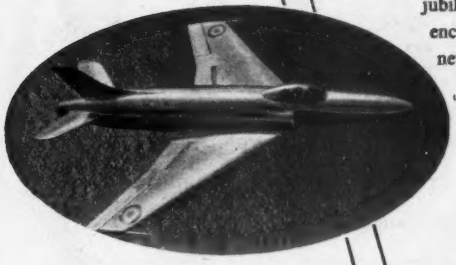

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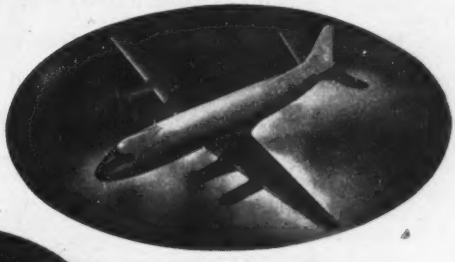

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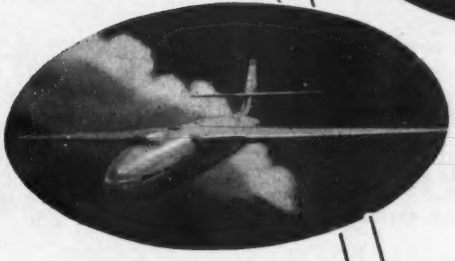

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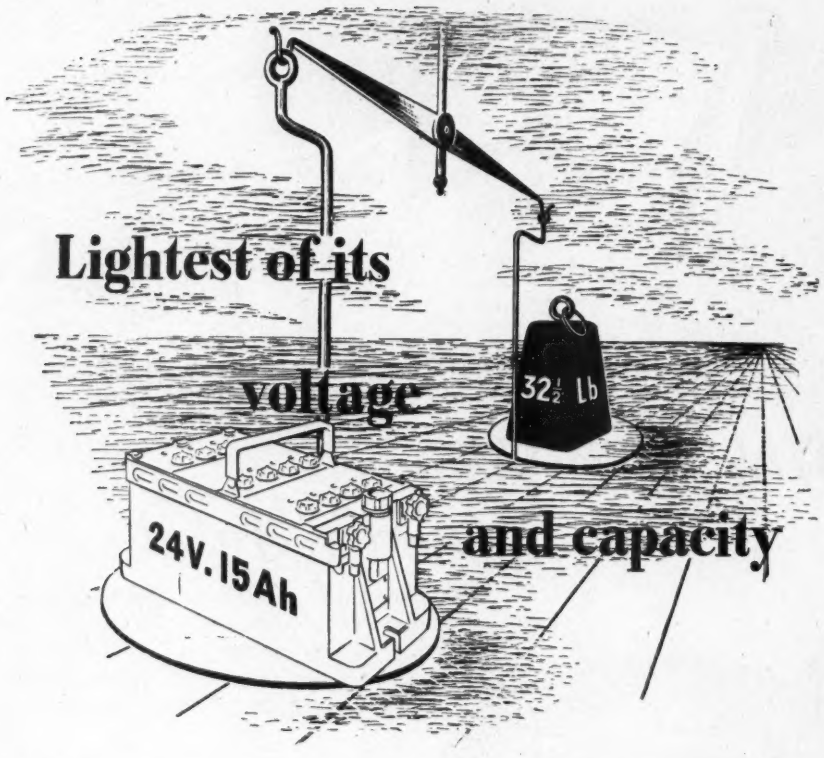

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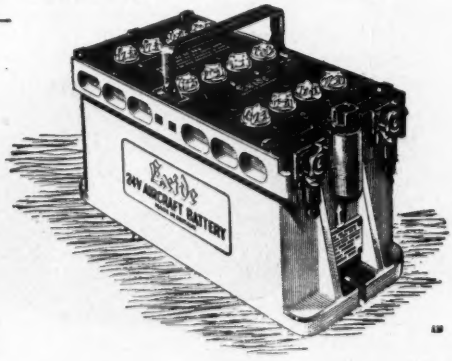

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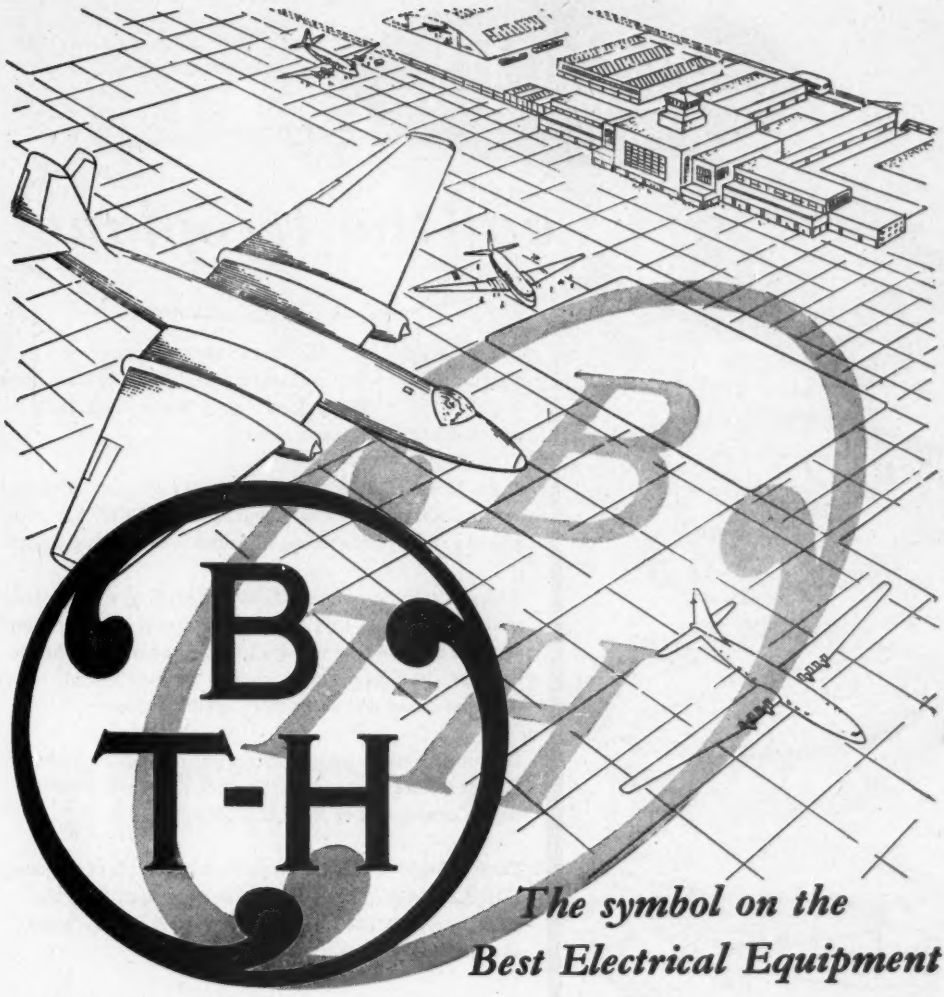

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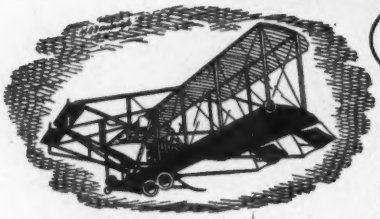

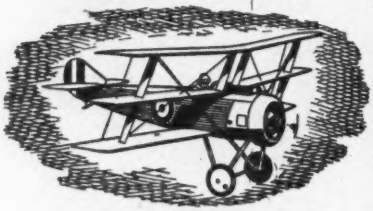

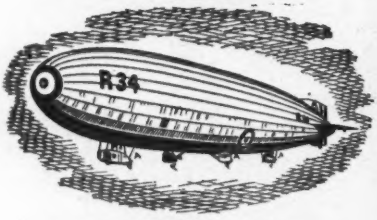

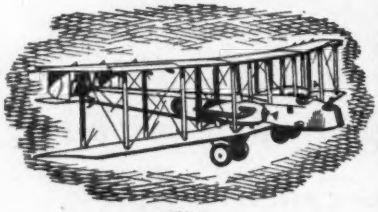

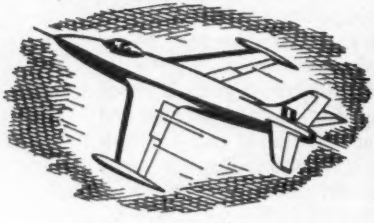

The most significant phase in the advancement of the modern aeroplane was undoubtedly the advent of aluminium alloys to replace the wood, string and fabric which had served the early aeronauts so well.

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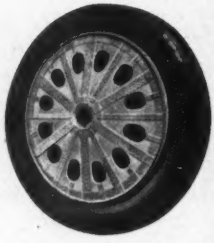

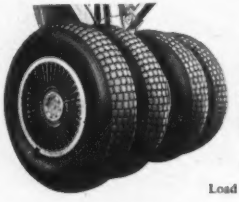

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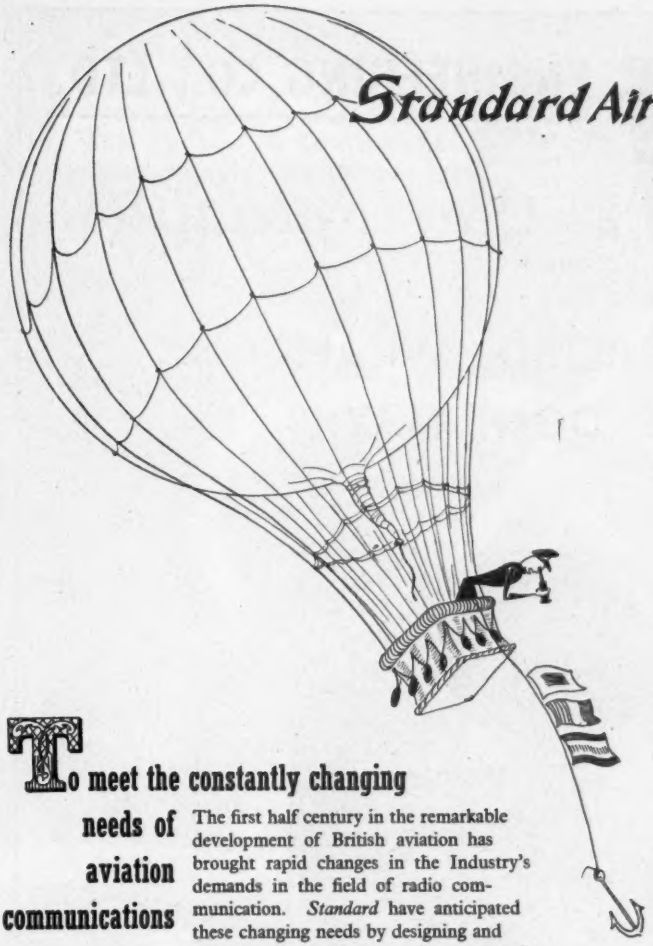

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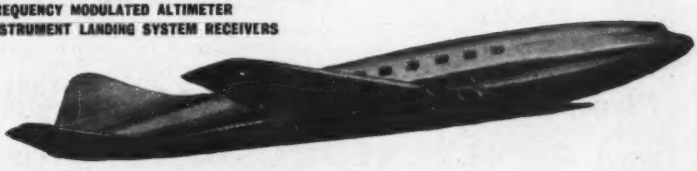

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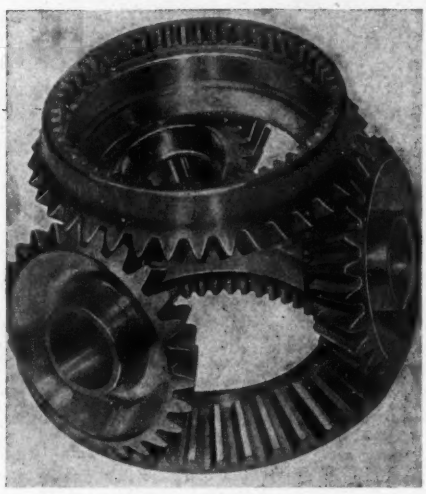

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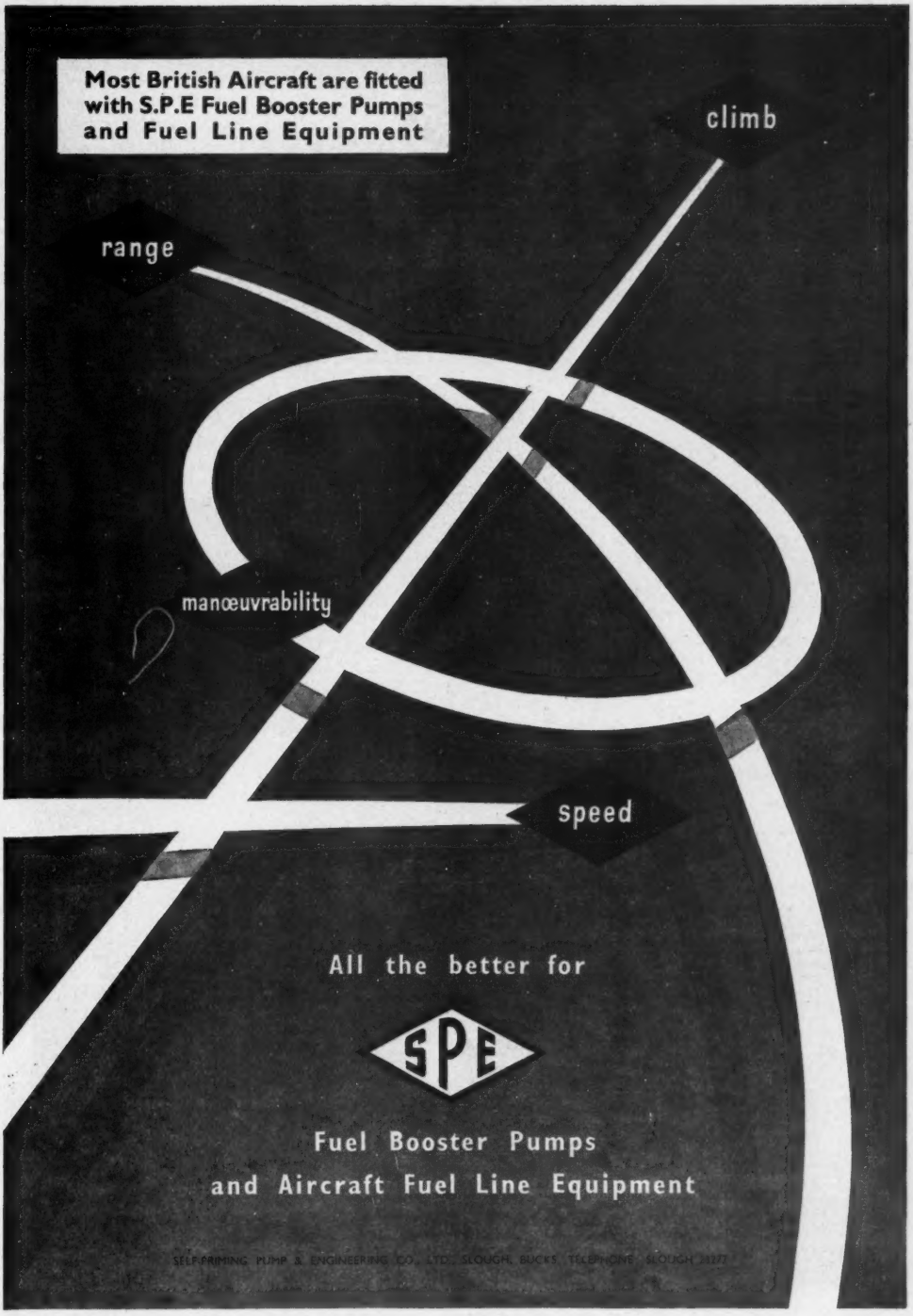
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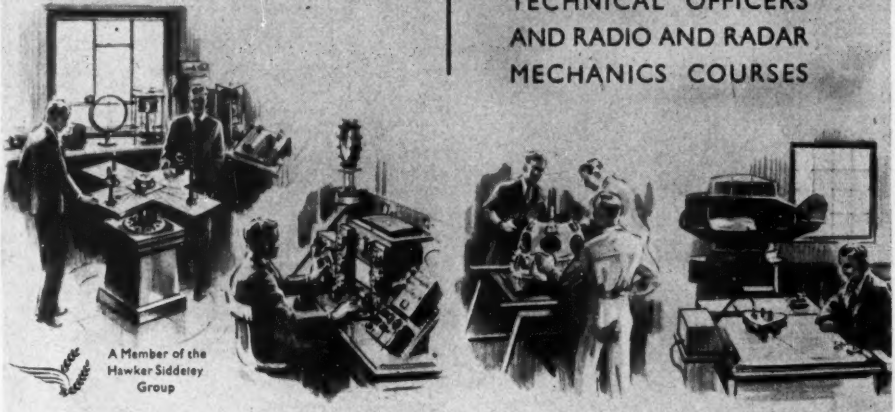

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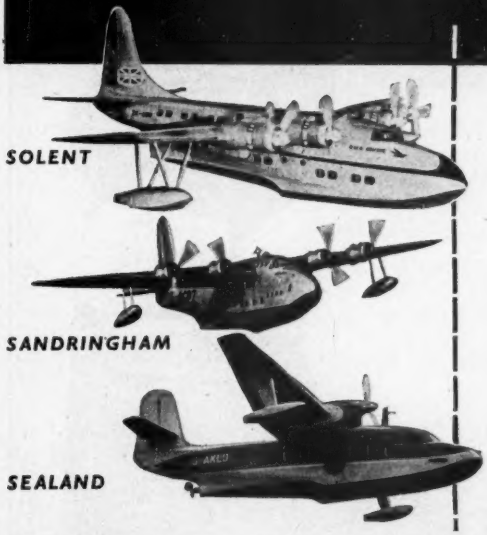

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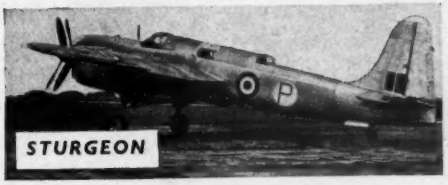

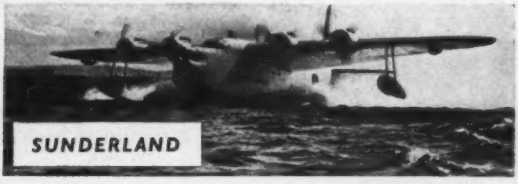

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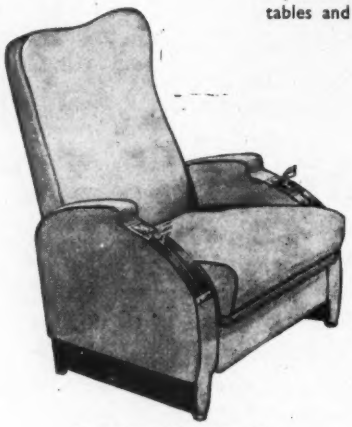

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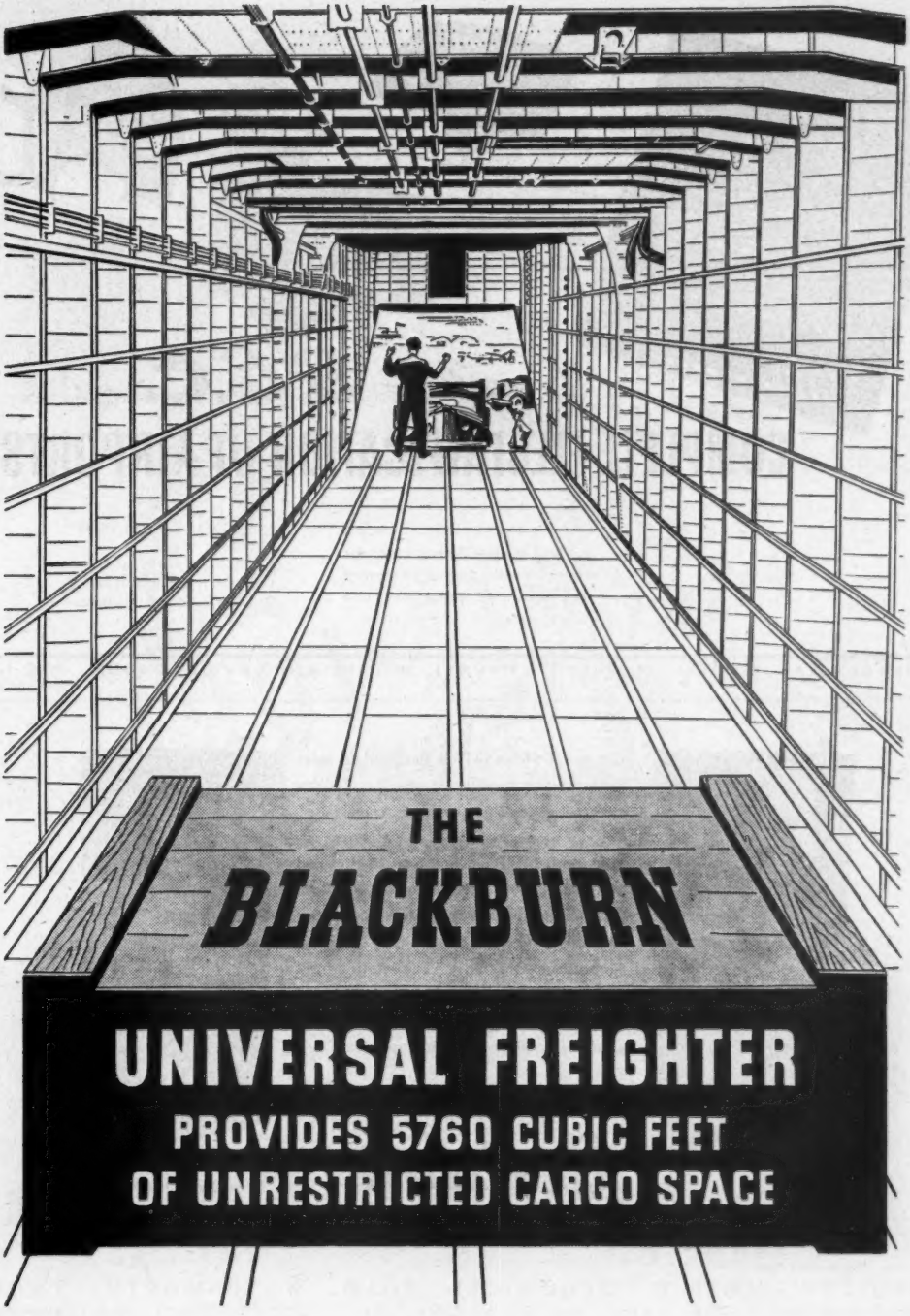
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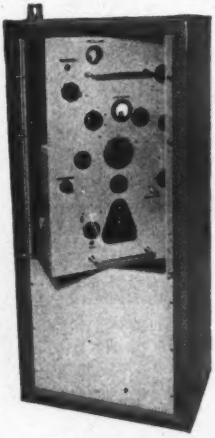

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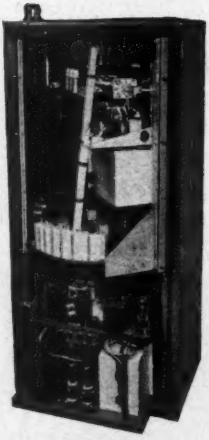

Chassis rotated and power units partly withdrawn.

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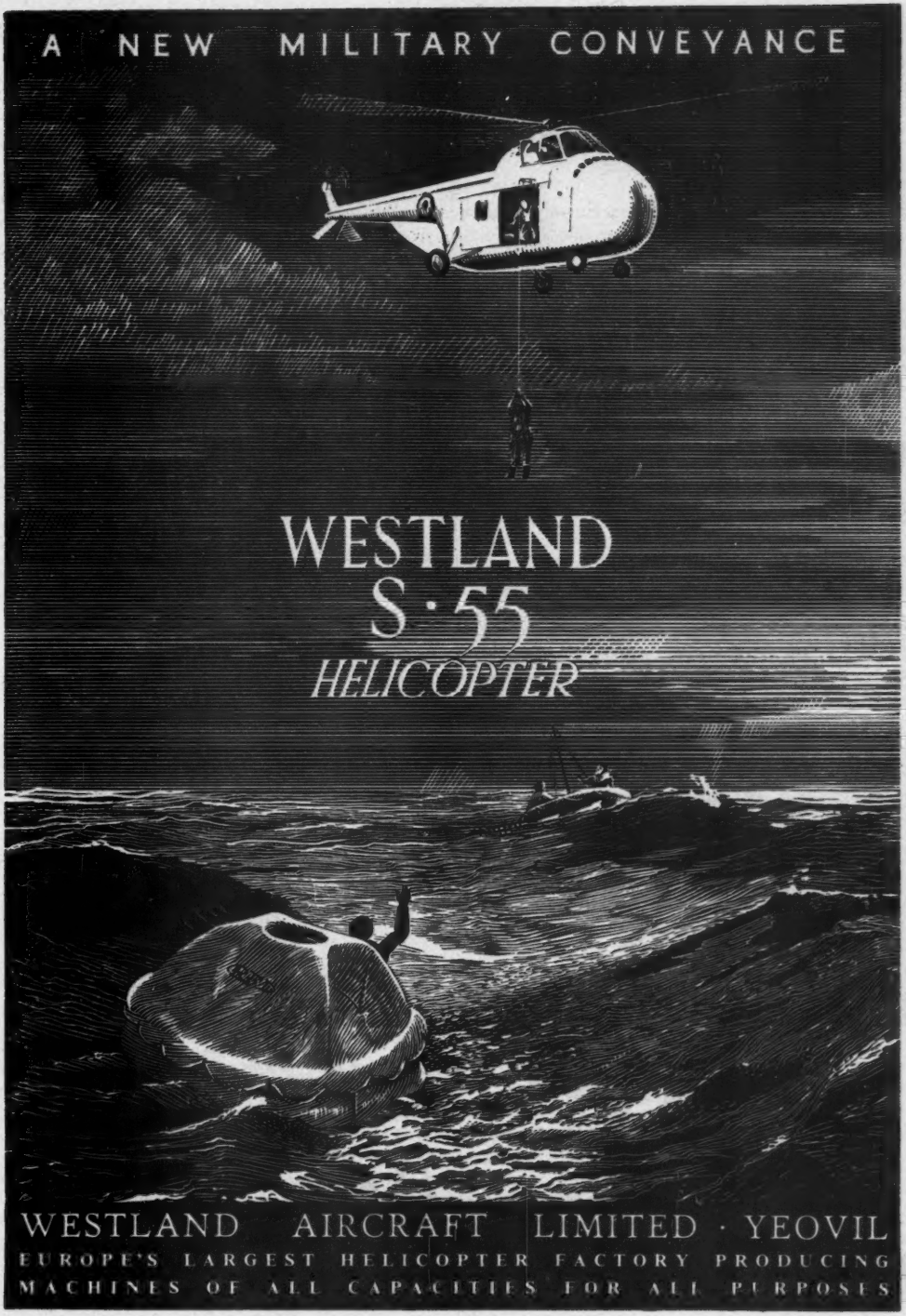
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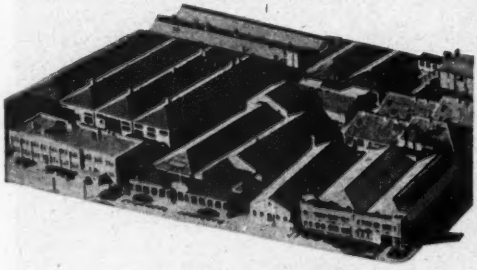

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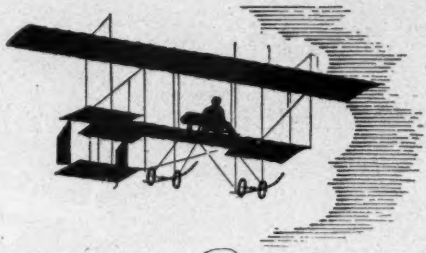

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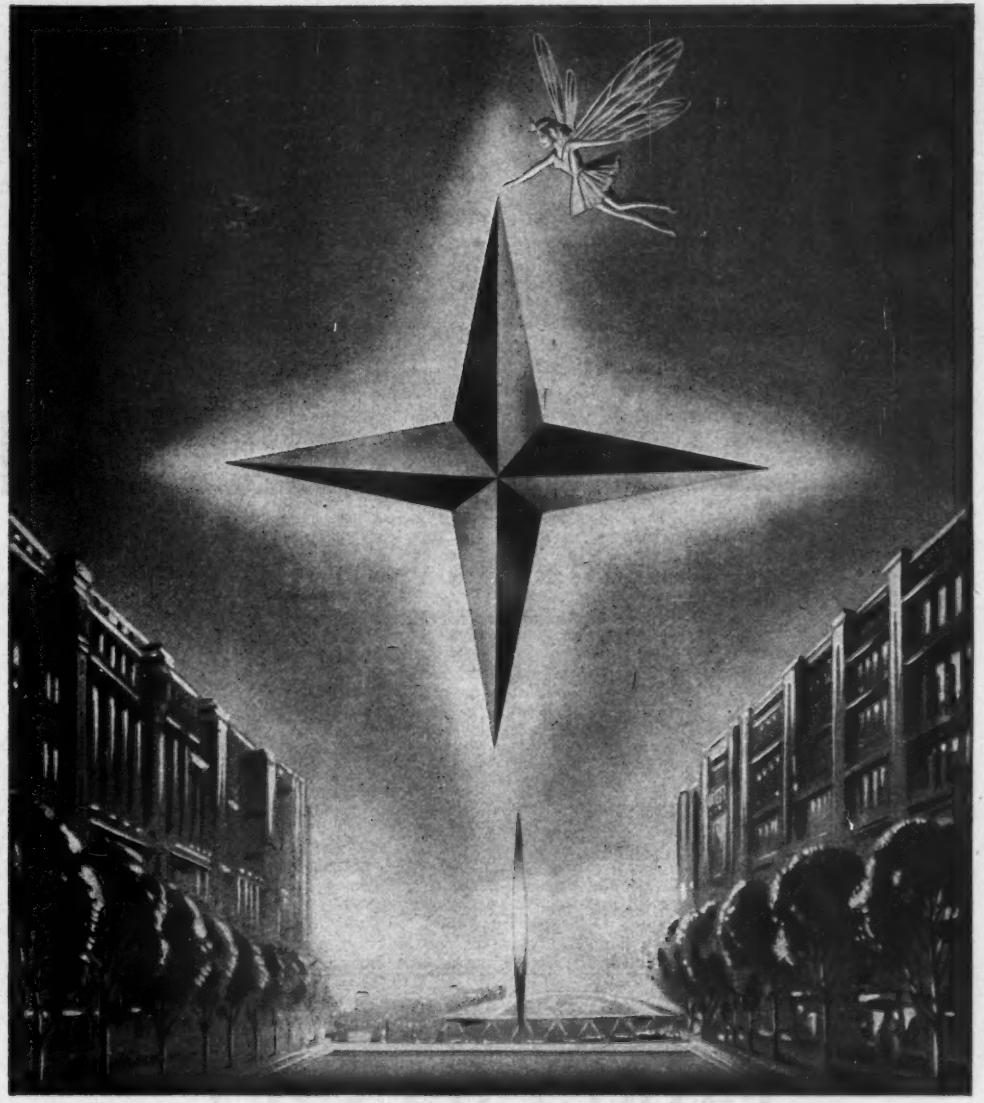

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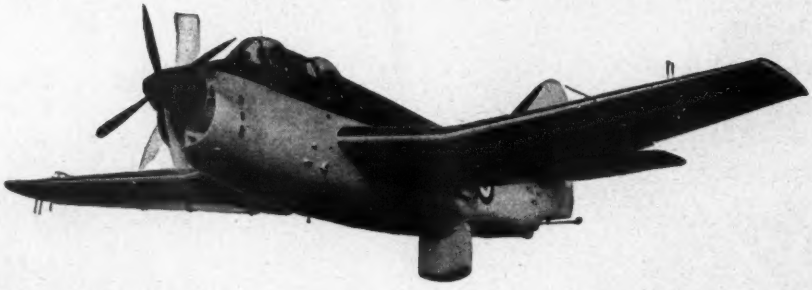

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Founded 1909

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History in London N.W.9.

THE London Aerodrome, Hendon, was not, it is true, the birthplace of flight in Britain; but it was cradle, nursery and playground. From this green field, at the end of Colindale Avenue, our pilots gingerly tried their new "buses" (as they delighted to call them) until they had gained sufficient confidence to vie in sport with sturdy rivals from abroad. At length, with native vision, they began to exploit their new-won skill in the opposing causes of commerce and war, and Hendon flourished; but the time inevitably came when aircraft had so far outstripped those of the brave old days that the little field—now hedged about by residential areas—had perforce to be humbled to the status of a mere communications centre. Never again, it seemed, would the citizens of London throng its verges and swarm on nearby Mill Hill to marvel at the evolutions of the great ones or thrill to the incomparable spectacle of the R.A.F. Display. The London Aerodrome, they said, was a has-been.

But there were resolute people who knew that Hendon, and only Hendon, must be the scene of a great festive gathering to mark the Golden Jubilee of the Royal Aero Club and a half-century of flying in Britain. There was no reason, they argued, for the very fast machines to land on the field itself, for these could operate, at little disadvantage, from their own bases, and static examples could, where necessary, be brought in by road. As for convenience, Hendon was far more accessible to Londoners than any possible alternative. And then, of course, there was the sentiment of the thing—for in its own way Hendon is as much a part of our heritage as Ranelagh, Wimbledon or Lord's.

So the resources of a national newspaper—the *Daily Express*—allied with the wisdom and experience of the Royal Aero Club, and with the co-operation of the fighting Services, overcame all difficulties, the happy result being that on three successive days, July 19th, 20th and 21st, the crowds will once again be flocking to Hendon to see the flying; and not only the flying, but also a static collection of aircraft old and new, calculated to make an enthusiast's mouth water.

If ever there was an occasion to delight old-timers and youngsters alike, this promises to be it, and a hundred-odd foreign participants in the International Air Rally, for whom a special excursion has been arranged, will see for themselves that, whatever may be responsible for Britain's lack of up-to-date light aircraft (for many of our privately owned machines to-day are near-antiques in themselves), it is not poverty of design talent. Moreover, they are flown in the same spirit of sportsmanship and camaraderie, and under the same vigilant protection of the Royal Aero Club, as were their forebears.

Likely to Mislead

IT is feared that an inaccurate impression of B.E.A.'s manner of operation may have been gained by many who have read the digests in the popular Press of the Mill Hill Dakota accident report (see page 83). The little knowledge required to single out certain points without fully understanding them was a dangerous thing. The accident report is not confined too closely to the disaster which befell G-AJIW on October 17th, but contains also some observations on the methods employed for cleaning sparking plugs, the sort of approach aid which a pilot should select, and the much-discussed topic of rearward-facing seats.

Let it be said at once that in spite of possible assumptions to the contrary, B.E.A.'s standards of safety, maintenance and training are unsurpassed by any airline in the world. The sparking plug question is one on which the A.R.B. might comment, for B.E.A.'s sand-blast cleaning methods are approved by this Board, as well as being widely employed in other countries.

The facts that the first officer (the captain was in the right-hand seat) while experienced and well qualified, was nevertheless known to be in need of more practice in procedures, and that he had failed to renew his licence (expired by five days), are most embarrassing revelations and, although essentially administrative discrepancies, are matters about which the Corporation will need no reminder to take action.

BRISTOL AIR DAY

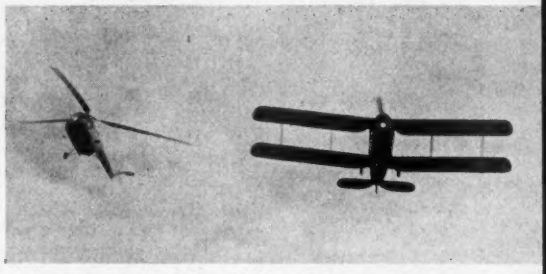
Over 20,000 Spectators See an Exciting Race and a First-Class Display

Illustrated with "Flight" Photographs

A PALE grey sky with a hint of rain in it lay ahead of us as, in *Flight's* Gemini, we first came in sight of Whitchurch Airport, Bristol, last Saturday. Intent on enjoying the full and varied menu promised by the Festival of Britain flying meeting and Air Race to be held there, we decided to keep our fingers crossed for the weather, but ten minutes after stopping our engines we were practically "shanghaied" into the clubhouse of the Bristol and Wessex Aeroplane Club where we decided, *force majeure*, to abandon our uncomfortable contortions and put our faith implicitly in the prophesy of a reckless young "weather-man" who was offering to "eat his hat if it rained that afternoon." Having clashed with the weather at some other air meetings this year, we should, perhaps, have adopted a philosophical outlook towards the possibility of a cancelled programme; on this Saturday, however, there was much that we would have missed, and over 20,000 spectators would have shared our chagrin if the display had not materialized.

Everyone was delighted, therefore, when just before two o'clock the sky had cleared and the three Chipmunks of No. 12 Reserve Flying School (Filton) which were to open the programme, could be seen warming up. Their performance in formation drill was, perhaps, not quite up to exhibition standard, but this shortcoming

Judging from his smile, Bristol's chief test pilot, Bill Pegg, enjoyed flying the 1917 Fighter as much as the audience liked watching his performance. His enthusiasm induced him, in fact, to give two shows for the price of one.



A friendly escort for the handsome old Bristol Fighter on the flight from Filton to Whitchurch was provided by a 171 Mk 3 Sycamore helicopter.

The line-up for the race brought forth the usual assortment of highly-tuned light aircraft. Among them can be seen the Cardiff Aero Club's Hornet Moth (32) and Mr. E. Day's Hawk Speed-Six (68), which unfortunately had to retire from the race owing to an exhaust defect.

was in part compensated for by a startling exhibition of side-slipping on the part of their leader as he came in to land. Meanwhile, the unusual spectacle of a Bristol 171 helicopter closely formating on a 1917 Fighter from the same stable was to be seen approaching from the direction of Filton. They touched down just as Ranald Porteous in the caster-wheeled Auster Autocrat got airborne for his usual gamut of aerobatics and "sideways" landings. His Autocrat gaily waltzed in wide circles on one wheel at a time, taking in a tour of almost the entire airfield so that each and every spectator should get his money's worth.

Formation drill by eight Vampires of No. 501 (City of Gloucester) Squadron, R.Aux.A.F., followed, and spoke volumes for the high standard of skill and precision which is now being achieved by the non-regular pilots.

A Bristol 171 Mk 3 helicopter next executed some effective pirouettes and ably demonstrated its really remarkable agility. Seafires from 1832 R.N.V.R. Squadron (Culham) then appeared from the east and, after two passes in tight "vics" and "boxes" proceeded to beat up the airfield in a dummy attack. A little ragged, we felt, but, nevertheless, noisy and satisfying.

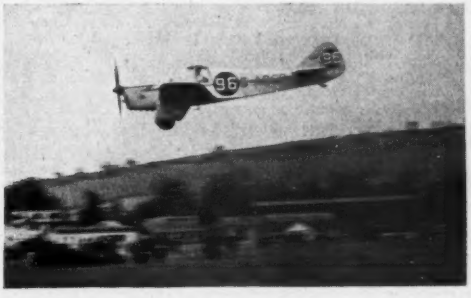
Since early afternoon a sad-looking barrage balloon had been wallowing dejectedly about 20ft above its mobile anchor. Now, it having been towed to the end of the runway and elevated to about 800ft, four parachutists of the Airborne Squadron of the North Somerset Yeomanry stepped from the basket beneath its envelope and floated down to *terra firma* beneath khaki canopies. Soon afterwards, Derek Colvin, of the Bristol Gliding Club took over, and pulled some tight loops and neat stall turns in his Olympia sailplane, and a single Vampire from Odiham gave an equally pleasant demonstration which included quite the slowest slow-roll we have seen.

The most entertaining turn, however, was without a doubt "Bill" Pegg's effort in the 1917 Bristol Fighter (with slots removed and loaned for the occasion by the Trustees of the Shuttleworth Collection). With his engine purring almost inaudibly he chugged steadily round a loop or two and caused many a raised eyebrow by his 1917 version of the slow roll—

THE BRISTOL AIR RACE

Registration	Pilot and Racing No.	Aircraft	Starting Time m. s.	Net Flying Time m. s.	Speed m.p.h.	Place
G-ADGP	R. R. Paine (96)	Miles Hawk Speed Six (D.H. Gipsy Vi)	28 19	27 47	193.0	1
G-AMBK	R. H. Bennett (40)	D. H. Tiger Moth (Gipsy Major I)	06 33	49 58	107.5	2
G-AHVG	H. Wood (71)	Percival Proctor I (Gipsy Queen II)	22 25	34 21	156.0	3
G-AKPE	D. C. Jemmett (39)	Miles Hawk Trainer (Gipsy Major I)	15 33	41 20	130.0	4
G-AFJB	Lt. Cdr. Stuart (48)	Wicko G.M.I. (Gipsy Major I)	15 23	41 41	128.5	5
G-AJXX	T. W. Hayhow (27)	Auster V (Lycoming)	10 15	47 18	113.5	6
G-AFDT	G. M. Kemp (32)	D. H. Hornet Moth (Gipsy Major I)	11 25	46 26	115.5	7
G-AKRH	P/O. M.R.T. Chandler (29)	Miles Hawk Trainer (Gipsy Major I)	12 52	45 13	118.5	8
G-AGVM	D. W. Corrick (23)	Auster Autocrat (Cirrus II)	10 03	48 08	111.5	9
G-AFSC	H. G. Davies (6)	Tipsy Trainer (Mikron II)	00 00	58 34	91.5	10
G-ADMW	A. E. Coltman (44)	Miles Hawk Trainer (Gipsy Major I)	19 08	39 32	135.5	11
G-AKKR	R. J. Downs (24)	Miles Hawk Trainer (Gipsy Major I)	19 22	39 33	135.5	12
G-AHHT	Capt. S. L. Slade (25)	Auster Autocrat (Cirrus II)	10 15	49 59	107.5	13
G-AKRV	E. Day (68)	Miles Hawk Trainer (Gipsy Major 1)	19 45	Retired		

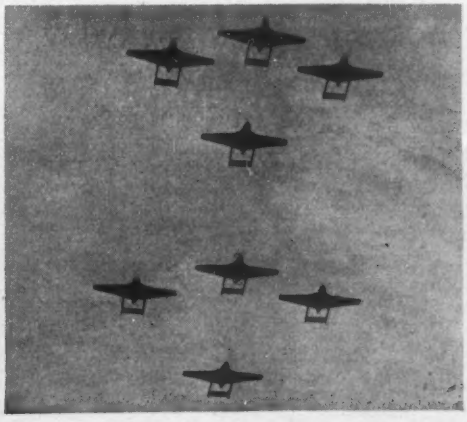
Flight's camera was in at the finish to catch Ron Paine's Hawk Speed Six passing the post at what must have been over 200 m.p.h.



A Deck Landing Control Officer from No. 767 Squadron, R.N.A.S. (Yeovilton) brings one of his obedient flock home to roost.

Ron Paine, Throttle Bender par excellence, was the popular winner of the Bristol Air Race. He has competed in every race this season.

Neat work by eight Vampires of No. 501 (City of Gloucester) Squadron.



BRISTOL AIR DAY . . .

a manoeuvre which, from our viewpoint, looked something like a horizontal spin. So much at home was Mr. Pegg in the cockpit of this sturdy old war-horse that later in the day he took off again, determined to get those rolls just right. Between Mr. Pegg's two sorties a formation of Sea Furies and Fireflies of No. 767 Squadron (R.N.A.S. Yeovilton) carried out simulated deck landings and take-offs in a tight stream with great precision. Although some pilot members of the audience were seen to wince eight times in sympathy with eight undercarriages as the D.L.C.O. signalled the "cut," each arrival would undoubedly have passed the test on a carrier's deck, which was, after all, the object of the exercise.

The well-known "Patrouille d'Etampes" contributed the last display event before the start of the Bristol Air Race. Conditions were ideal for their exacting performance and, if anything, the four pilots (Capt. Bienaimé was the individualist), even surpassed their earlier shows in this country. Particularly impressive was an inverted turn which they made in very tight formation.

The race for the Challenge Cup presented by the Bristol Corporation brought a line-up of 14 competitors, the Throttle Benders' Union being well represented. Tnree laps of a 30-mile circuit (Whitchurch-Portishead-Clevedon-Lulsgate-Whitchurch) were flown in conditions which were really ideal for racing. The handicapping was unusually good, and a tight finish saw Ron Paine's rakish Hawk Speed-Six home just ahead of R. H. Bennett's Tiger Moth. Mr. H. Wood in a Proctor I took third place. A Miles Hawk Trainer flown by E. Day was unfortunate enough to lose an exhaust pipe during the race—an occurrence which, it is thought, probably robbed this machine of second place.

Prizes were presented to the winners in the clubhouse by the Parliamentary Secretary to the M.C.A., Mr. F. Beswick, M.P., who was deputizing for the Lord Mayor of Bristol. The entire programme had been organized by Mr. L. R. Williams, airport manager at Whitchurch, on behalf of the Bristol Corporation and the Bristol and Wessex Aeroplane Club.

FROM ALL QUARTERS

Test Pilots' Pay

A RECENT report in a national newspaper stated that the seven civilian test pilots employed by the Ministry of Supply are seeking an increase in pay from their present £900 to £1,000 a year up to £2,500 to £3,000 a year. The report further states that the salaries paid by civilian firms to their test pilots range from £2,000 to £3,000, and that the Ministry has offered the seven civil servant pilots £1,500. This last figure (comments the report) is less than B.O.A.C. pilots' pay.

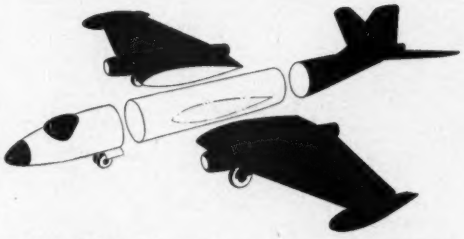
Enquiries indicate that much of this is nonsense. Every sympathy is felt with the claim for higher salaries for test pilots : no matter whether of service, civil-servant or civilian status, a test pilot is worth two to three times the pay he gets at present. But more harm than good is done to the cause by half-baked and inaccurate reports.

At the present time, only a very select few of the top-notch civilian test pilots employed by the aircraft and engine manufacturers earn a salary of more than £2,000 a year. According to experience and the work they do, the lesser test pilots earn amounts varying from £1,700 down to about £800 a year. By this rather niggardly scale of values, therefore, the civil servant pilots are being made a reasonable offer by the Ministry at £1,500. For the record, B.O.A.C. transatlantic captains and other elite may earn over £2,000 a year; but the vast majority of Corporation pilots earn not more than half this figure. As for the serving officer, he gets no more money for test flying than for other flying duties.

Arguing about the B-36

SITTING in closed session the American House of Representatives armed services committee recently heard about the new U.S.A.F. programme for the construction of new bases in America, Europe and North Africa. A sum of 3,580 million dollars is involved. Subsequently certain representatives stated that they had received a "shocking" report from Brigadier-General Sweeney to the effect that only 80 bombers of the Convair B-36 type were ready for action. Another 60 were in process of modernization. Brigadier-General Sweeney is further reported to have told the committee that between two and three of these bombers are being produced monthly.

HONOURED IN EDINBURGH: Sir Edward Appleton (left), Principal and Vice-Chancellor of Edinburgh University, conferring the honorary degree of Doctor of Laws upon Air Commodore Sir Frank Whittle.



FARMING OUT THE CANBERRA: About 60 per cent by weight of the English Electric Canberra (B-57A) will be subcontracted by the Glenn L. Martin Company, which is building a "substantial number" of a night-intruder version for the U.S.A.F. The subcontracted parts are shown black in this sketch. (See "Visitor from Martin," page 61.)

Hurricanes Again

IT is probable that within a few weeks the public will see organized flying by formations of Hurricanes for the last time. After a world-wide search for an operational group of these wartime veterans, the Air Ministry and the Hawker Siddeley Group finally located five Hurricanes attached to the Portuguese Air Force.

The Portuguese government agreed to lend these machines to take part in the Battle of Britain film *Hawks in the Sun*, currently being filmed by Associated British Films at Elstree. Piloted by Portuguese Air Force officers under Major Duarte Silva, the Hurricanes flew to Hawker's Langley factory to be camouflaged to represent the eight-gun version of the Battle of Britain days, and from there went to Tangmere for a good-will mission on July 16th.

More Hands

ACCORDING to figures recently quoted by the S.B.A.C., employment in the British aircraft manufacturing and repairing industry rose in April by 1,300 to a total of 157,900. In June, 1948 the total number of men and women employed was 141,500.

May Exports and Imports

EXPORTS by the British aircraft industry for May, 1951, totalled £3,958,698, a considerable increase on the monthly average of £3,080,000 for the previous twelve months. The annual rate, as assessed on the figures for the first five months of this year, stands at £45¼ million as against last year's actual total of £34,275,423.

The May export total was made up of aircraft, engines and components to the value of £3,921,001 and tyres valued at £37,697.

May imports, at £1,032,695, stood at 26 per cent. of the export total. In the previous twelve months they had amounted to 31½ per cent. of the exports, so the May figure represents a favourable fall in the balance.

Two complete aircraft to a combined value of £32,000, and brought in for repair and re-export, figured in the May import total.

Comet Statistics

IN reply to a parliamentary question by Mr. G. Ward concerning the de Havilland Comet variants fitted with Ghost and Avon turbojets, Mr. G. R. Strauss, the Minister of Supply, quoted the following figures supplied by the de Havilland Aircraft Co., Ltd.:

	Comet 1 (Ghost)	Comet 2 (Avon)
1. (a) Still-air range with capacity payload allowing for fuel reserves	2,030 statute miles	2,610 statute miles
(b) Capacity payload (48-seater)	14,000 lb	14,000 lb
2. (a) Maximum still-air range with full tanks (7,050 imperial gallons) allowing for fuel reserve	2,960 statute miles	3,700 statute miles
(b) Corresponding payload (There is, of course, no intention of operating in this way.)	2,200 lb	2,200 lb
3. Block-to-block speed (allowing for take-off, climb, cruise and descent) over a stage of 1,500 miles	411 m.p.h.	444 m.p.h.
4. Estimated direct operating cost per capacity ton mile	13.5d	13.1d

In reply to a previous question by Mr. Ward the Minister had stated that the estimated cost of the development of the Comet to be borne by his department, excluding engines, was about £1½ million. If the estimated sales of production aircraft were achieved, it was expected to recover the whole, or a substantial part, of this expenditure.

New Designations

SECURITY "de-grading" of certain types of aircraft and engines was recently announced. Thus the Napier Nomad NNm3 composite power plant, comprising a piston-engine and a gas turbine, is now officially authorised to be illustrated and displayed. It is hoped to publish photographs of this unusually interesting all-British development before the S.B.A.C. display, where an example will be on view.

The official designation of the Naval communications version of the Percival Prince is given as Sea Prince C.2.

New glider designations are Kirby Cadet T.3 and Eton T.1. The former applies to a tandem-seat, dual-control development of the Cadet 2, manufactured by Slingsby Sailplanes, Ltd. It is used by the A.T.C. for elementary instruction and quite a number are being shipped abroad. The Eton T.1, made by Elliots of Newbury, Ltd., is a primary training glider which has been in production for about three years as the Primary Eton.

Shell Managing Directorship

FOLLOWING the retirement of Sir George Legh-Jones as a managing director, Mr. F. J. Stephens has been appointed a managing director of The Anglo-Saxon Petroleum Co., Ltd., and of the Shell Petroleum Co., Ltd. He is also made a delegate member of the board of N. V. de Bataafsche Petroleum Maatschappij, The Hague. These three concerns are the three principal operating companies of the Royal Dutch/Shell Group. The appointments are effective from July 11th.

"FELLOWSHIP OF THE AIR"

ON page 70 of this issue B. J. Hurren writes of a fascinating task on which he has been engaged for many months past—the compilation of an official history of the Royal Aero Club from its inception (as the Aero Club of the United Kingdom) 50 years ago.

It is now possible to announce that this notable work is due to appear early in September, coincident with the 50th anniversary of the Club's foundation. The publishers will be Iliffe and Sons, Ltd., and the format selected is a handsome one: there will be over 230 10in. x 7½in. pages—with the text on laid paper and 90 photographs on art paper—in cloth binding with jacket. The price is to be 30s., or 30s. 9d. by post from the publishers.

More about the contents of the book will appear in *Flight* in due course and the Royal Aero Club will shortly be sending full particulars to members of a special "Club Edition." We can promise that the work is far more than a mere factual history: as its title—quoted above—suggests, it is equally the story of British aviation during these epic 50 years, for the Club has been indissolubly bound up with the adventures, fortunes, hopes and fears of its members, who, then as now, have included the leaders of the aeronautical industry and almost all the great pilots.

SERVING THE MARINES: First operational unit to be equipped with the Douglas F3D-1 Skyknight, a two-seater, deck-landing night fighter, is Marine Squadron VMF(N) 542, shore-based in California. Depicted is a Skyknight of this unit flying at 18,000ft.

Visitor From Martin

MR. RICHARD W. DARROW, director of public relations to the Glenn L. Martin Company, has been visiting England to discuss with the English Electric Company advertising questions connected with the building of the Canberra jet bomber in America. It would hardly have been surprising if these discussions had disclosed some conflict of ideas but when, in London last week, we met Mr. Darrow and the English Electric officials with whom he has been conferring, we were quickly reassured in this regard.

On the same occasion Mr. Darrow screened a colour film illustrative of Martin products which might well be taken as a model by any British company contemplating something similar. Included were some intimate and sometimes dramatic glimpses of the U.S. Navy's Viking research rocket, the Gorgon ramjet pilotless aircraft, Mercator composite-powered patrol bomber, Marlin flying-boat, XB-51 three-jet bomber, and Canberra.

That W/C. Beamont had made an impression with his demonstrations at Baltimore we were already aware; but it was a warming experience to see the Martin employees so captivated by his flying and by the altogether exceptional capabilities of the Canberra.

Military Transports to Come

TO those in the aircraft industry and the Services who anxiously await news of orders for new military transport aircraft the questions and answers on the subject heard recently in the House must have been something of a disappointment, although there was given a faint hope of action in the near future.

In answer to an enquiry by Mr. C. I. Orr-Ewing regarding the jet-engined transport envisaged as the successor to the Hastings, Mr. Arthur Henderson said that "the aircraft which will take the place of the Hastings will be used for long-range operations and will not be required to operate in and out of small emergency airstrips." (Two days previously, when asked by A. Cdre. Harvey if the four-jet transport aircraft mentioned earlier as being under consideration by the Secretary of State for Air were Comets, Mr. Strauss, the Minister of Supply, had said he would require notice of the question.)

Mr. Orr-Ewing also asked for an assurance that "we are proceeding with the development of suitable aircraft both from the Airspeed factory and from the Blackburn and General Aircraft factory," and Mr. Profumo asked what types of transport aircraft were to be supplied to the R.A.F. for carrying and parachuting vehicles and heavy military equipment and stores.

Mr. Henderson said that it was intended to acquire for the R.A.F. types of transport aircraft capable of such duties, but he stated "quite frankly and at once" that no orders had been placed for aircraft of the type to which members referred. A discussion of the meaning of "under active consideration" used in connection with the placing of orders for transport aircraft followed. Questioning members had finally to be content with a statement that a paper dealing with one of the aircraft discussed was to be considered by the Air Council at its meeting very shortly. Until the Air Council, representing the Service side as well as the political side, had come to a decision, orders could not be placed for any aircraft.

Good Stewardship

THOUGH he is nowhere referred to in any material in this issue devoted to the Royal Aero Club, tribute must be paid to Mr. A. F. O'Connor, the house secretary. In 1938 the total takings of the club were £6,000. Mr. O'Connor joined after the war, since which time business has improved so briskly that in 1950 takings reached £76,000 for the year.

HERE AND THERE

Canberra Deliveries

IT is now learned that the second east-west transatlantic flight by an English Electric Canberra is unlikely to take place before late August. The first delivery to Australia, however, is expected to be made this month.

American Super-Carrier

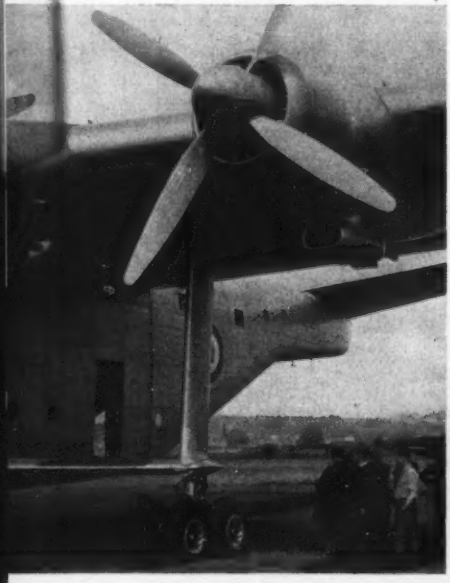
THREE years will be required to build the 59,900-ton aircraft carrier, ordered for the U.S. Navy. With a length of 1,040ft and width of 252ft it will be by far the largest vessel of its kind. The "island" will be retractable to give a completely flush flight deck.

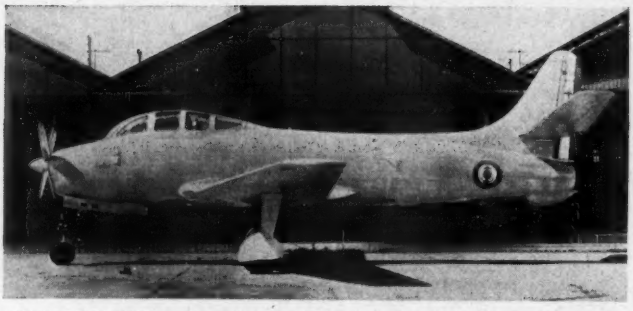
Third Anglo-American Conference

THE Royal Aeronautical Society announces that the number of registrations for the Third Anglo-American Conference to take place at Brighton between September 4th and 7th, has greatly exceeded expectations. No applications can be accepted after July 23rd.

New Napier Factory

NEGOTIATIONS are in progress for the construction of a factory at Bootle, Lancs., to be jointly operated by D. Napier and Son, Ltd., and the Ministry of Supply, for the production of Rolls-Royce Avon turbojets. More than 6,000 workpeople are likely to be employed. The probable site—at present open grassland—is some 70 acres in extent.





COMPOSITE POWERED, with an Armstrong Siddeley Mamba turboprop and a Hispano Nene turbojet, is the Bréguet 690 deck-landing strike aircraft, the first prototype of which is shown. A land-based single-seater development is envisaged.

Naval Day

R.N. Air Stations Gosport and Lee-on-Solent announce that they will be holding their combined annual air display at the latter station on September 1st.

Dorothy Spicer Essay Contest

THE 1952 Dorothy Spicer Memorial Prize Essay Contest is announced by the Society of Licensed Aircraft Engineers. Open to licensed engineers within the British Commonwealth, the competition is for a paper (up to 5,000 words in length) on any one of a wide variety of subjects concerned with aircraft maintenance and operation. The closing date is not until February 29th next, but prospective competitors are advised to make early application, for entry forms and rules, to the S.L.A.E. general secretary at Finsbury Circus House, Blomfield Street, London E.C.2.

Atlantic Jet Pilot Honoured

THE Harman International Trophy, given to America's outstanding pilot of the year, has been awarded to Col. D. C. Schilling in recognition of his flight-refuelled crossing of the Atlantic in an F-84E last September, when he flew from Manston to Limestone, Maine, in ten hours. Another Thunderjet accompanied him, but its pilot had to bale out over Labrador.

THE FEET OF A GIANT: First views of the new bogey undercarriage in place on the Blackburn and General Aircraft Universal Freighter. The close-up shows the "sponson" and also strut, but not the fairing between the two.

FASTEST AND HIGHEST: As already recorded, Douglas test pilot Bill Bridgeman, whose portrait is reproduced here, has flown faster and higher than any other human being. His mount was the Douglas Skyrocket.

IN BRIEF

THE various grades of Klinger jointings, with compressibility and resilience data and a guide to selection for a wide variety of applications, are dealt with in an attractive colour-printed brochure newly published by Richard Klinger, Ltd., Klingerit Works, Sidcup, Kent.

* * *

Flight regrets to learn of the death, which took place suddenly on June 27th, of Mr. H. C. Mills, managing director of the Morgan Crucible Co., Ltd., London, S.W.11.

* * *

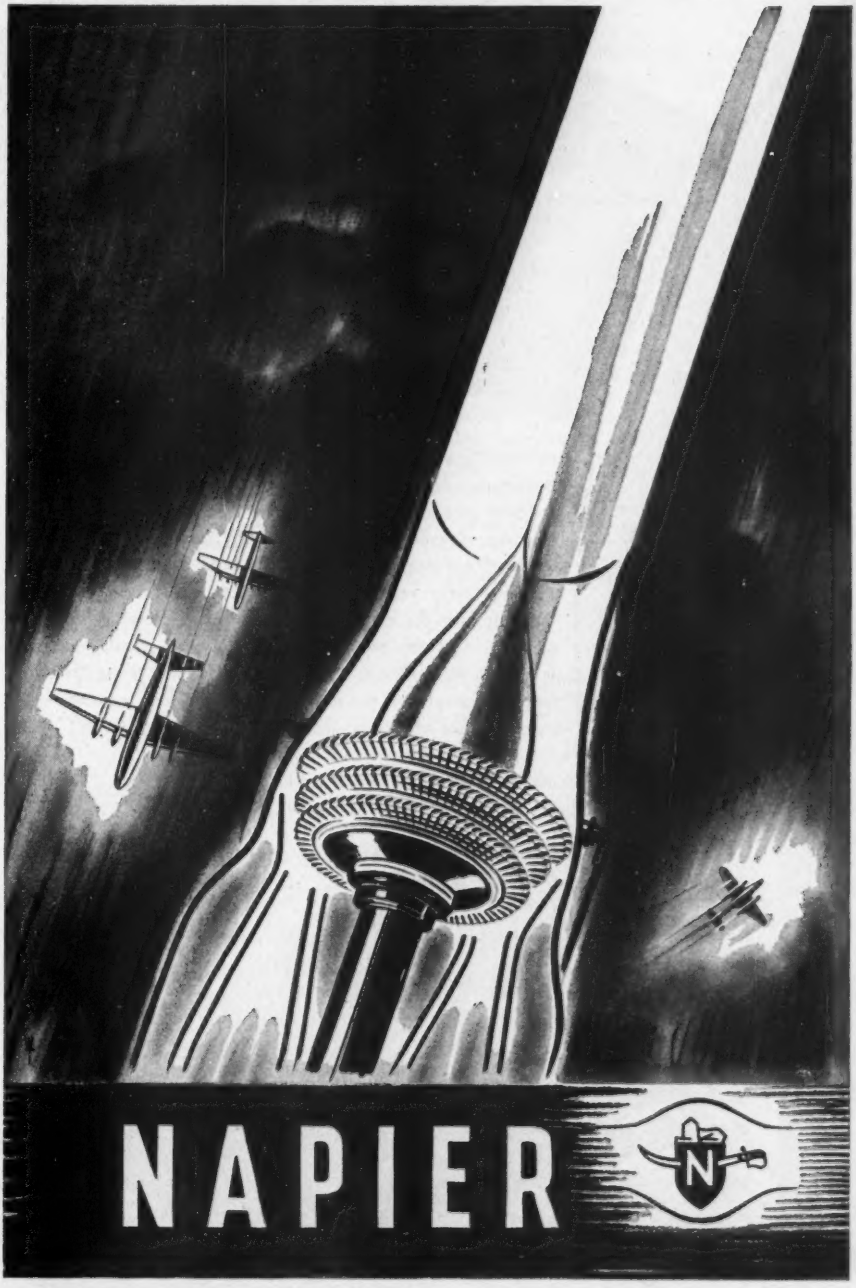
A. C. Wickman, Ltd., the Coventry machine-tool specialists, have changed their name to Wickman, Ltd.

* * *

At the recent annual general meeting of C. C. Wakefield and Co., Ltd., Mr. L. W. Farrow, C.B.E. (chairman), said that the new Stanlaw plant was almost complete and was already providing the major part of the group's oil production. It included a unit for the production of special additives.

* * *

A "Besco" pocket-book of conversion tables and other data, with a number of pages of graph paper for note-taking, has been prepared by F. J. Edwards, Ltd., 359-361, Euston Road, London, N.W.1, and is obtainable from them at 3s.



AERO ENGINES

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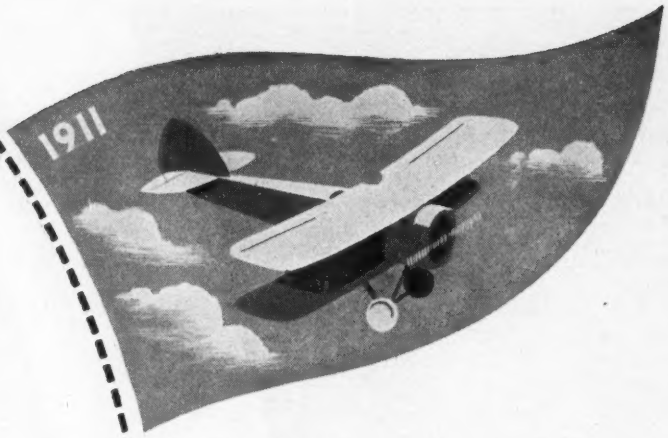
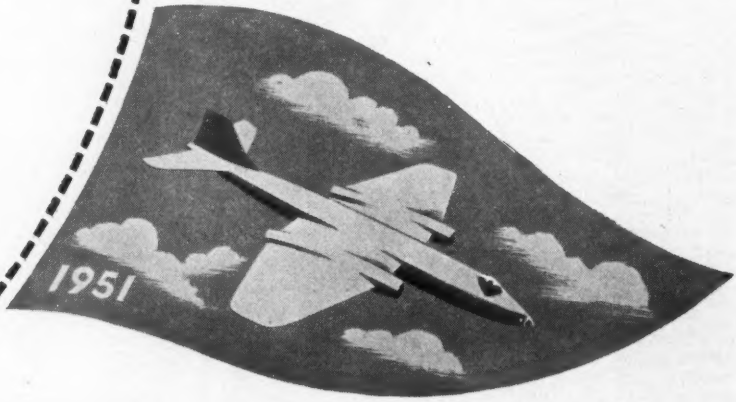


40 years in the first flight

In the first flight of manufacturers since 1911, Cellon have been producing aircraft finishes of the very highest grade, keeping abreast—and frequently ahead—of technical developments within the aircraft industry. For over forty years the advice of Cellon has been sought regarding a multitude of problems relating to aircraft finishing. The fact that Cellon produce to approved specifications a complete range of protective finishes for *all* civil and military aircraft is the finest tribute to the success of their activities. The Cellon research laboratories are constantly devising new materials to match new developments in the field of aeronautics. The result is that today the recognised finish for flights of every description is Cellon.



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THE OLD HANDS PAY TRIBUTE

Jubilee Messages to "Flight" Readers from Builders of Britain's Aircraft Industry

THOUGH several of the names appended to the messages on these pages were familiar—even famous—before 1914, it was not our intention to restrict the contributions to the earliest pioneers alone. Rather we chose to seek the views of some of the older hands in the industry to-day—men who have not only seen the industry grow, but who, in various capacities, have been instrumental in advancing its growth themselves.

We believe that readers will share our pleasure that the outlook revealed in these messages should be so fresh, the choices of theme so happy, and anything in the nature of pomposity—even on the part of the most illustrious—so conspicuously absent.

From **ROBERT BLACKBURN, O.B.E., A.M.I.C.E., Hon. F.R.Ae.S.,** *chairman, Blackburn and General Aircraft, Ltd.*

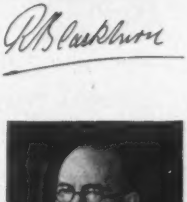
IF it is permissible to apply the terrestrial term "milestone" to an aeronautical event, then the Jubilee of the Royal Aero Club is certainly a milestone in the history of aviation. To everyone concerned I offer my sincere congratulations on creating and maintaining an authoritative British body which is admired and respected throughout the world.

Although it is now 43 years ago, I well recall my first association with the Club at 166 Piccadilly, whose premises also housed aviation insurance brokers and the great C. G. Grey. In 50 years the R.Ae.C. has pioneered and promoted flying, and I trust that it will continue to progress with equal success in the years to come.

To my mind one of the intriguing aspects of aviation is that it has, in the main, been born and grown up within my own lifetime. There were, of course, many early inventors, such as Yorkshire-born Sir George Cayley, who contributed to the conquest of the air; but "heavier-than-air" flying is generally accepted to date from the Wright Brothers.

Since my initial flight from the sands of the Yorkshire Coast some 42 years ago, aircraft have developed with a rapidity which is most gratifying. Speeds have progressed from a modest 60 m.p.h. to beyond the speed of sound, and engine power has increased over one hundredfold. My first monoplane weighed approximately 800 lb, whereas today a prototype weighing 100,000 lb is being regularly test-flown from Brough.

This growth of aviation in so short a space of time is truly remarkable, and the major share of the credit for popularizing private flying must be given to the Royal Aero Club. As Britain's representative at international conferences, as the governing authority on sporting activities, and as the father of all aero clubs, the R.Ae.C. commands respect for 50 years of worthwhile endeavour.



From **W. G. CARTER, C.B.E., F.R.Ae.S.,** *technical director, Gloster Aircraft Co., Ltd.*

AS we go forward to enter the second half of what eventually will become a century of aviation we can be justly proud of the contribution which has been made by British enterprise in furthering the development of aeronautical science and engineering. We can also be sure that British industry will continue to play a part in every way worthy of its great heritage and tradition. Inseparable from this field of endeavour, the Royal Aero Club stands acknowledged and supreme as the arbiter of all that is best in the provision and co-ordination of facilities concerned with flying as an art rather than as a science. In these days, with so much emphasis on scientific investigation and research, it is indeed good to have those other, not so easily definable, qualities thus worthily represented and upheld.

From **H. T. CHAPMAN, C.B.E., A.F.R.Ae.S., M.I.Mech.E.,** *managing director, Armstrong Siddeley Motors, Ltd.*

MY colleagues and I take pleasure in sending to the Royal Aero Club our greetings and sincere good wishes on the occasion of its 50th anniversary. Long may it continue to support so ably the cause of aviation.

We have progressed a long way since the Club first came into being. Yet, as we stand today at the beginning of the jet and rocket age, we sense again the thrill of the pioneer.

I often feel that there is a kinship between those early days and now. Then, when we were making our first attempts to fly, it was with very little knowledge of where it was all going to lead us. Now, on the brink of supersonic flight and the rocket, we again stand facing the unknown.

It must be the sincerest hope of all of us that man will use this ever-growing knowledge for the betterment of the peoples of the world.

From **SIR GEOFFREY DE HAVILLAND, C.B.E., F.R.Ae.S., Hon. F.I.A.S.,** *director, The de Havilland Aircraft Co., Ltd.*

IT is with the warmest feelings that I write this message of felicitation to the Royal Aero Club at the mark of its first half-century, and my colleagues in the de Havilland companies enthusiastically join me in wishing the Club a long continuance of its record of service and goodwill in the world of aviation.

How difficult it is to believe that 50 years have gone by since those days when, as youngsters taking our engineering training, we tried to convince our elders that the motor car was something more than a passing craze! In the opening years of the century the possibilities of flying in a heavier-than-air machine, with an internal combustion engine, made a call that to several of us was irresistible—a call to which we responded with only the vaguest notions of where it was going to lead us.

Wars and the fear of them have forced the pace of our progress, albeit at a cost, and have given aviation a form that we never envisaged in those early days. What sort of races and records will the Royal Aero Club be timing in the year 2001, I wonder, and will personal venture then yield a reward for merit?

I do indeed wish the Aero Club all success in the years ahead, and I pray that men may learn to direct aeronautics and all science to constructive purposes.

From **Sir ROY DOBSON, C.B.E., F.R.Ae.S., J.P.,** *managing director, A. V. Roe and Co., Ltd.*

IT is a good thing to celebrate anniversaries, for they provide an excuse to look back over the years—and memories should be the most treasured things anyone can possess. I therefore particularly welcome this special issue of *Flight* devoted to the Jubilee of the Royal Aero Club—although I cannot remember right back to 50 years ago, for I was then only a small boy.

My first clear recollection is of Louis Paulhan landing in 1910 at Burnage, near Manchester, when he won the £10,000 *Daily Mail* prize for the first London-Manchester flight. At the time I was an engineering apprentice, but my imagination was so fired that I decided to "get into aviation" at the earliest possible moment. I at once became a fervent reader of every word printed in *Flight*, and as soon as my apprenticeship was finished I joined Avro's. In those early days few people thought that aviation could be regarded as a serious matter, but for the last 37 years I have somehow or other managed to earn a living in it by developing, making, flying and selling whatever was produced..

There is a wonderful story in the way that, from this "sport of the rich and mad," the present staid and respectable aircraft industry has grown. Like most sports, aviation has today become so commercialized that it is no longer a sport but a business. And that is a great pity.

The sporting side of aviation is not always concerned with flying. I remember that one evening after I had dined at the Royal Aero Club with John Lord and one or two other people we thought it would be a good idea to smuggle-out the Schneider Trophy. As those of you who have seen the Trophy will realize, this wasn't exactly an easy thing to do. But we succeeded—although I am not going to tell you how!—and I don't think I have ever seen anyone quite so furious as was dear old Harold Perrin. He was quite right, too!

I think the best things the Club has ever done were the Light Aeroplane Trials at Lympne, run by Harold Perrin and Francis McClean (now Sir Francis). These meetings were simply wonderful and did a power of good to the aircraft industry—at a time when it was badly needed. Another grand thing is the way the Club has brought together so many people with but one idea in mind—the furtherance of aviation. Just to walk through its doors brings flooding back memories of the wonderful pilots and designers, backbone of the whole movement, whom I knew as regular habitués.

There is only one unfortunate fact about such well-organized and eminently useful associations as the Club and its official organ, *Flight*. It is that, like many other good things in life, one tends to take them far too much for granted. Let us, then, salute them both in this Jubilee Year.

From **A. G. ELLIOTT, C.B.E., M.I.Mech.E., F.R.Ae.S., M.S.A.E.,** *joint managing director, Rolls-Royce, Ltd.*

IN looking back over the last 50 years it is interesting to reflect that although the force of gravity was the first motive power invoked in the original efforts to fly, the advancement of flying has always waited on the development of the prime mover employed to supply propulsive force.

The early aircraft engines owed their genesis largely to the motor car and it can be said that the technical effort which was put into racing car engines made a particular contribution. The extent to which the motor car was handmaiden to the aircraft was, moreover, not limited to motive power, but covered other important component developments.

However, aircraft development has long since gained an impetus and reached a status which has completely outgrown its youthful associations. Latterly, it has even acquired a new form of prime mover in its own right: it is now in process of passing from the era of the piston engine to the long-foreshadowed epoch of the turbine. Reciprocating motion is in this way giving place to continuous motion, which is along the line of true evolution. The prime mover, the source of propulsion, is becoming almost as aerodynamic in character as the aircraft and the two begin to merge into a more cohesive whole.

Heat release from combustion, as exemplified in piston engines, turbines, rocket motors, etc., is the basic source of power for flight today and will continue to be for some time to come, but new sources of energy are becoming apparent which may in the course of time be utilized.

There are no known limits to development, and as we proceed from one stage to another, we are always standing on some new threshold.

From **SIR RICHARD FAIREY, M.B.E., Hon. F.R.Ae.S., Hon. F.I.Ae.S.,** *chairman and managing director, the Fairey Aviation Co., Ltd.*

FIFTY years is a large slice out of a human life, but small indeed in relation to the awe-inspiring developments that have taken place in aviation in that time. It is against that background that we can appreciate the enterprise and enthusiasm of those who started the Royal Aero Club half a century ago.

It is pleasant indeed to have memories and knowledge of those delightful early days and now to congratulate the Royal Aero Club on its jubilee.

One's own recollections go back to the early days at Shellbeach and Eastchurch, where the pioneer colony of the Royal Aero Club had started a nursery of aviation, first of civilians alone and then of the nucleus that was the beginning of the Royal Naval Air Service. One's mind goes back to such figureheads as Sir Francis McClean, Mr. Alec Ogilvie, Professor Huntingdon, Mr. Jezzi and Mr. J. W. Dunne, and the great Commander Samson with his three colleagues, of whom Air Chief Marshal Sir Arthur Longmore and Major Gerard are the only survivors. Presiding in the technical sense over them all was the figure of that great engineer, Mr. Horace Short, and bright among recollections of those early days is the personality of that sturdy and genial figure, Harold Perrin.

As a proud possessor of the earliest issues of *Flight*, including the Show Number of the First British Aero Show, it is pleasant also to congratulate the editor and staff; one realizes now what a fine companion to all this great activity this great journal has been.

Others will remember the parallel developments taking place at Brooklands, Hendon, Laffan's Plain, and under the Bristol Company in the west country; and since anyone who recalls all these things is perforce coming to the end of what is politely termed "middle age" one's most poignant reflection is that, despite its present troubles, at no time in history would one rather have been born, and that no better fate could have befallen one than the privilege of knowing the pioneers of mankind's greatest physical achievement.

From **J. LLOYD, F.R.Ae.S.,** *technical director, Sir W. G. Armstrong Whitworth Aircraft Co., Ltd.*

I AM very glad to have this opportunity of adding my small contribution to express appreciation of the outstanding stimulus which has been given so unstintingly by the Royal Aero Club to the aircraft designers, manufacturers and users, and to the Ministry of Supply departments, to aid the development of faster and lighter aircraft both for military and civil application.

The Royal Aero Club was formed some years before I became interested in aircraft at the Royal Aircraft Establishment, and finally with Sir W. G. Armstrong Whitworth Aircraft, Ltd., with whom I have been closely associated in the design and development of over 30 types, starting with Siskins and coming finally up to the A.W. 52 Flying Wing and Apollo.

I would like to add a tribute to the value of the Schneider Trophy and King's Cup Races, and to aeronautical displays, in stimulating the efforts of British design teams in producing aircraft second to none.

When, in the early days, we had engines of 50 h.p., we used to talk vaguely about gas turbines, but we never imagined then that in 1951 such turbines would be giving the enormous outputs they do today.

I have seen significant improvements during the last few decades, such as retractable undercarriages, a complete swing-over to monoplanes, the jet engine, low-drag wings, boundary-layer control, and tailless aircraft.

I conclude with my sincere congratulations to the Royal Aero Club on attaining its 50th anniversary; may it long continue with its good work.

From **J. D. NORTH, M.I.Mech.E., F.R.Ae.S., F.S.S.,** *managing director, Boulton Paul Aircraft, Ltd.*

WE shall all wish to offer to the Royal Aero Club our congratulations on its Jubilee, which it celebrates this year. That the date of its foundation was 1901 recalls to us that it was founded in an era which preceded the discovery by the Wright Brothers of how effectively to control a heavier-than-air flying machine. The principal means of aerial locomotion at that date was the spherical balloon which, so far as my personal experience goes, provided a means of air transport which combined an aesthetic pleasure with an absence of vulgar utility quite lacking in the aeroplane. It was an aerial vessel appropriate to the age of optimism which came to an end in 1914, when aviation, to our everlasting regret, ceased to be an adventure and became a business.

Even in 1909, when *Flight*, the official organ of the Royal Aero Club, was founded, its first editorial referred to "the still simmering distinctions which are apt to be drawn between the 'lighter-than-air' and 'heavier-than-air' advocates," but by this date the ascendency of the aeroplane was already apparent. One sometimes hears a member of the new generation of aeronautical engineers (who are accustomed to spending on the development of a single aircraft more than was spent by the entire world on the first conquest of the air), refer to this as the "stick-and-string era," an epithet which, I suggest, quite fails to do justice to the engineering ingenuity of the period. It might be a useful education for them to read from cover to cover the copies of aeronautical journals of that time, as read by all who were fortunate then to be able to purchase them for the sum of 1d. In honouring the achievements of the present day let us not forget those giants on whose shoulders we stand.

From **SIR FREDERICK HANDLEY PAGE, C.B.E., Hon. F.R.Ae.S., F.C.G.I., Hon. M.Inst.T., Hon. F.I.Ae.S.,** *chairman and managing director, Handley Page, Ltd.*

I WOULD like to offer my very sincere congratulations to the Royal Aero Club on its 50th anniversary.

It is amazing to think of the great developments in flight which have taken place in those 50 years. Who, at that date, would have thought that the Club, founded to carry on the sport of ballooning, would have seen the art of ballooning recede into the background and its place taken by heavier-than-air flight, with many thousands of pilots' certificates to be issued by the Club?

It was only five or six years after the Club's foundation that the *Daily Mail* offered a prize of £10,000 for the

first aeroplane to fly from London to Manchester. So remote did the possibility seem to the ordinary public that a London evening paper published the following paragraph:—

"A morning paper makes the trivial offer of £10,000 to the first aeroplane that flies from London to Manchester. Our own offer of £10,000,000 to the flying-machine of any description whatsoever that flies five miles from London and back to the point of departure still holds good. One offer is as safe as the other."

I am sure that no one, on that September day in 1901 when the Club was founded, could have visualized the shape, speed, power and perfection of things to come.

Under the compelling demands of war requirements in the first world war the large bomber was brought into being, and developed in peace-time into the big passenger-transport aircraft for regular commercial services. Again in the second world war there has been the same compelling force in development; and now, with the advent of the jet, speed and, in fact, all performances, have been carried to limits which until the last few years would have seemed impossible.

During these 50 years the Royal Aero Club has fostered the sport of flight and has championed safety in the air. Its active encouragement to everyone interested in air matters has been a leading factor in promoting the aviation developments that have taken place in the last 50 years.

Harald Penrose.

From **HARALD PENROSE, O.B.E., F.R.Ae.S., A.M.I.N.A.,** *chief pilot, Westland Aircraft, Ltd.*

TO have witnessed in the early years of the century a few of the flights of Hamel, Grahame-White, Salmet and Slack, and later to have participated in some of the tremendous development which within half a century has culminated not only in supersonic speeds and encompassment of the globe, but has opened vistas of even greater achievement—this I count as something of a privilege. There is a fascinating viewpoint in standing between the old, slow-moving world and the new at a juncture which future historians will consider dramatically significant.

As a schoolboy, I knew of the Royal Aero Club through Sir Charles Rose, who was its chairman in 1912; but, though the Club controlled the sport of flying, it was not until the Lympne Light Aeroplane Competitions that I saw this motive force in action as personified by the redoubtable Harold Perrin. Coincidentally, it was with the original 1924 Widgeon entrant that, later, I first flew for the Westland Aircraft works.

From that time onward, recollection is coloured not only by a long series of Westland-designed machines and several thousand hours' flying above a particularly beautiful part of England, but also by many a light aeroplane meeting, parentally controlled by the Royal Aero Club and attended by men and women who first and foremost were enthusiasts for aviation.

In these more difficult days of regimentation and regulation, one wishes the Royal Aero Club and its official organ, *Flight*, every success in their endeavour to uphold the liberty of private flying—for the art of piloting a little aeroplane should be the perquisite of any young men who seek not merely adventure, but freedom and spiritual achievement.

J. Parker.

From **JOHN LANKESTER PARKER, O.P.E., F.R.Ae.S.,** *director, Short Bros. and Harland, Ltd.*

I AM pleased that *Flight* has asked me to add to the general congratulations that will be flowing in to the Royal Aero Club on attaining its jubilee, though I can claim to have been a member for only two-thirds of that time.

However, I still have the honour of being a member of the company—now Short Brothers and Harland, Ltd.—who, in those distant days, were the officially appointed makers of balloons to the Aero Club (as it then was). I was flying seaplanes on Windermere in 1916 when Admiral Murray Sueter, "the father of naval aviation," invited me to visit his friend, Oswald Short, who was in need of a test pilot. That interview at Rochester will live long in my memory, as indeed will the subsequent one later in the day with elder brother Horace Short at Eastchurch. There was little to indicate at the time that the temporary employment I thus obtained would lead to a long association with Oswald Short and the many interesting developments, particularly in the use of metal construction, which he originated.

Although I am thus comparatively new to aviation, it may be interesting to note the great developments which have occurred, even in my time. The first seaplane I tested—flat out—over the measured mile attained 33 m.p.h.

The Royal Aero Club was going strong then; it is going even stronger now—good luck to it.

A. Smith

From **J. SMITH, C.B.E., F.R.Ae.S., A.M.I.Mech.E.,** *chief designer, Vickers-Armstrongs, Ltd.*

FIFTY years in any industry, even a well-established one, would naturally cover many advancements and developments in whatever product was produced. Fifty years in aviation has seen the birth of an industry, its expansion —accelerated by two world wars—and its establishment as one of the most important and largest industries in the country today; and progress, as one would expect in a new industry, has been rapid. To those who have been engaged on aircraft design and construction for many years it does not seem a very far cry to the days when aircraft manufacture was largely a matter of juggling with string, piano-wire, fabric, wood, glue, nails and wood screws; in fact, to the time when one felt that one's engineering training had been wasted. But any such feeling was soon dissipated by enthusiasm for this entirely new form of engineering.

Thirty years ago we worked out with great accuracy the ordinates for wing sections, and at rib stations these forms were more or less reproduced—and then mutilated by fabric chafing-strips and fabric stringing. Between rib stations, the sections reproduced were nobody's business, and a beautiful herring-bone effect on lift and stabilizer surfaces was usually achieved.

Today the design and manufacture of aeroplanes has become a most complicated form of precision engineering, employing thousands of specialists in such fields as aerodynamics, structures, hydraulics, pneumatics, fuel systems, engine installational problems, etc. Advances in performance and handling qualities have been startling even to those engaged in the industry. The Schneider Trophy contest alone saw speeds increase from 45.7 m.p.h. in 1913 to 340.08 m.p.h. in 1931, and, as is well known, sonic speed has now been achieved. Rates of climb are now thought

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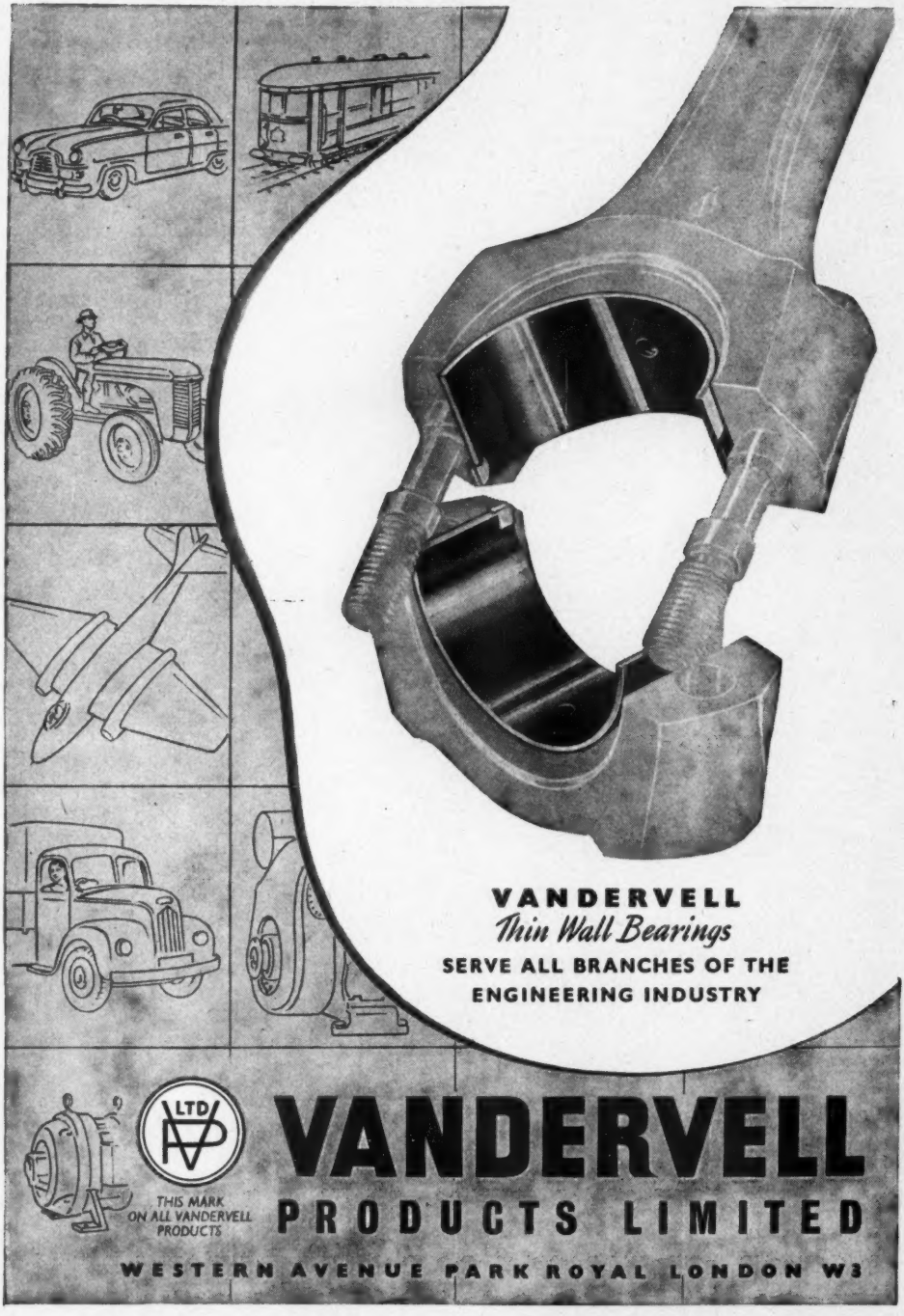
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of in tens of thousands of feet per minute, and handling characteristics assessed by reference to recorded quantities.

Throughout these years of development industry has always had the help and backing of that great body of enthusiasts banded together in the Royal Aero Club. In the spheres of racing, record attempts, private flying, air touring and, in fact, in every activity relative to aircraft, the help given by the Club and its members has been a source of great encouragement to the trade.

Congratulations to the Club on the attainment of its 50th birthday.

G. Bu. Sopwith.

From **T. O. M. SOPWITH, C.B.E., Hon. F.R.Ae.S.,** *director, Hawker Aircraft, Ltd., and chairman of Hawker Siddeley Group.*

IT doesn't seem possible that the Royal Aero Club has been in existence for 50 years and its official organ, *Flight*, for more than 40. Both are so essentially young and progressive, and in this respect—as in so many others—reflect the "Peter Pan" spirit of aviation so admirably. This is, perhaps, not a sound metaphor, for aviation, unlike Peter Pan, has most certainly grown up; in doing so, however, it has managed to maintain a youthful, vigorous outlook.

I have been a member of the Royal Aero Club since 1908 and I remember buying those first copies of *Flight* (priced, I think, at a penny) in 1909, the year before I flew for the first time.

Since those days the whole character of aviation has changed—and in some ways the change is far from being for the good. In the early years we flew because we liked it: it was grand fun. Today, we are overridden by grim necessities. Many people would still like to fly for fun, but it is increasingly difficult for the average man to do so.

In spite of all difficulties, the Royal Aero Club continues to do a wonderful job in encouraging the sporting side of aviation. There is not a single aspect which it does not take under its wing. And I am sure that in this country we still need people to whom aviation is not simply a business, but something that gets into your blood and becomes a lifelong passion. The Club works hard to foster this spirit, admirably backed by *Flight*. This is why I say: "Long may they both flourish."

C. F. Uwins

From **C. F. UWINS, O.B.E., A.F.C., F.R.Ae.S.,** *managing director (aircraft division) of the Bristol Aeroplane Co., Ltd.*

"FIFTY Years of Aviation." What a picture is conjured up for those of our generation for whom the names Bleriot, Grahame-White, Cody, Gustav Hamel, Sopwith, Rolls, de Moulinais, and many others were in our boyhood a constant thrill! Now we look back in retrospect over two wars and the intervening years and recall the machines we flew, the friends we made, and those in great numbers we have seen pass on in the pursuit of the great idea.

We can have few regrets, save perhaps that under the impetus of war progress has been so rapid; for who does not still dream nostalgically of the Pup, Fighter or Box-kite, on which so many happy hours were spent? And if today the drone of high-flying engines is a constant reminder that Green Airway I extends over our homes to the westering sun, that flying is regimented and that for us the thrill of adventure has largely gone, let us also recall the camaraderie of the Service in which we were so proud to serve, and of our Associations—of which the Royal Aero Club stands pre-eminent—and be thankful that it has been our lot to go forward in such good company.

A Special Message from **BARON DE LA GRANGE,** *President of the Fédération Aéronautique Internationale.*

NOT the least of the reasons for congratulation of the Royal Aero Club is the cordiality of its relations with similar bodies abroad, maintained through the Fédération Aéronautique Internationale. From its headquarters in Paris the F.A.I. has accomplished much in the case of private flying and, through its Commission Internationale de Tourisme Aérien, maintains a close liaison with I.C.A.O. We consider it a privilege to print the message below.

A. de la Grange

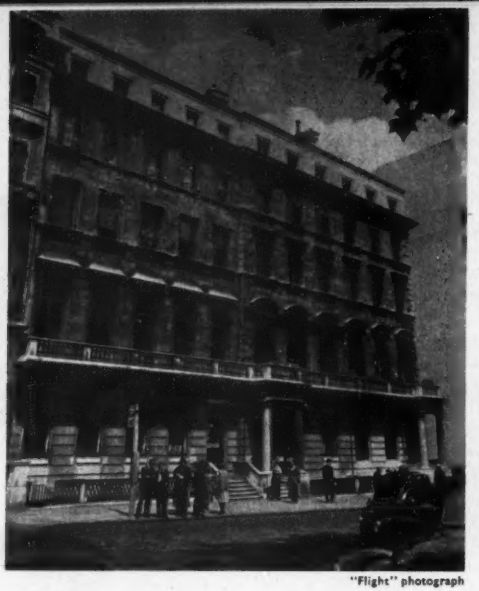
THIS year of 1951 is one of memorable anniversaries among the aero clubs who are members of the F.A.I. In the list of these clubs is the Royal Aero Club of the United Kingdom, to whom I now send the sincere congratulations of the Federation.

The Royal Aero Club was represented by Professor Huntington at the inaugural meeting in Paris on October 14th, 1905. Since that date many distinguished names in British aviation have served on the various committees of the Federation. Lord Brabazon of Tara was its president for two years, from 1946 to 1948. These were two difficult years, when our Federation was reviving its activities after the bitter years of the late war.

It is very pleasing for me, as president, to know that within the Federation and among all its members there is but friendship and collaboration in the interests of private aviation.

The Royal Aero Club has always been in the forefront of private aviation and air touring, and it still shares this position with other tried and enthusiastic members. The achievements of British aviation are too well known to need mention, but it is not too much to say that the Royal Aero Club has played an important part in these achievements; the sporting spirit is in-bred in the British character, and this spirit is kept alive in the aviation world by the air races, air rallies, and aviation meetings organized by the Club, all under the rules laid down by our Federation.

The F.A.I. is trying in every way to assist private aviation to overcome the difficulties to which it is at present subjected by economic factors and by Government regulations, because, unless private aviation can flourish, the air sense which is so necessary to the future of all branches of aviation will have no opportunity to develop. To this end, also, the Federation is devoting its energies in development of gliding and the making and flying of aeroplane models; in Britain all these branches of private aviation are under the care of the Royal Aero Club, and its efforts deserve the unstinted support of everyone who has an interest in civil aviation.



"Flight" photograph

"119"—the Club's present home: it occupies most of the block shown.

The Story of the Royal Aero Club

How it all began — and a Note on a History soon to Appear

By . . . . B. J. HURREN

THE glasshouse glory of the old Crystal Palace at Sydenham slipped away as a gentle west wind wafted a balloon on an aerial voyage to Sidcup, fifty years ago on a fine September day. "Why don't the aeronauts form a club of their own?" innocently asked Miss Vera; and her father, the indomitable Frank Hedges Butler, cast a questing glance at his young companion, the Hon. C. S. Rolls, whilst the professional pilot, Stanley Spencer, went about his business.

Immediately on landing, steps were taken at Somerset House to register "The Aero Club of the United Kingdom"; and thus, from that chance remark on September 24th, 1901, began the present Royal Aero Club of the United Kingdom—for it was raised to this status in 1910.

The Aero Club was legally registered on October 29th, 1901, and its existence was advertised in *The Times* on November 1st. An organising committee met on December 3rd, and disbanded itself on March 7th, 1902. By then it had caused to be established a company named Aero Proprietary, Ltd., on February 11th, with an initial capital of £100, increased on February 19th to £1,000 in 1s. shares.

This concern is the holding and financial company behind the Royal Aero Club, and the Main Committee members are *ex officio* directors. The first board, and hence the first Main Committee, was made up of the following gentlemen:

T. B. Browne	W. R. Pidgeon
F. H. Butler	C. F. Pollock
F. W. H. Hutchinson	Hon. C. S. Rolls
Mark Mayhew	Paris E. Singer
Hon. J. Scott Montagu	Roger Wallace
E. Campbell Muir	Hugh Weguelin

The present Main Committee, in the Club's jubilee year, consists of:

President—Lord Brabazon of Tara, M.C., P.C.

Vice-Presidents.—Capt. Sir Geoffrey de Havilland, Kt., C.B.E., A.F.C., Lord Gorell, C.B.E., M.C., Sir Francis K. McClean, A.F.C., Sir Frederick Handley Page, C.B.E., The Duke of Sutherland, Kt., P.C.

Chairman.—Whitney W. Straight, C.B.E., M.C., D.F.C.

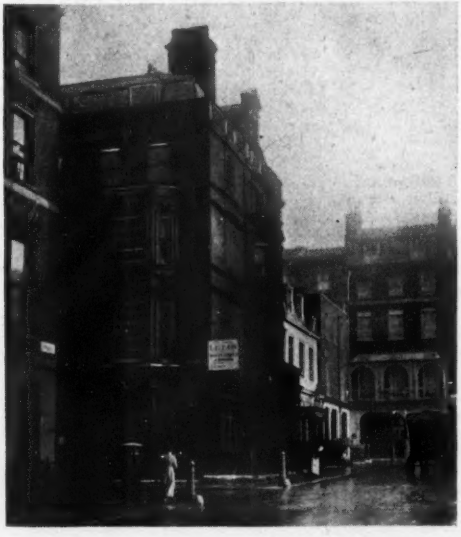
Vice-Chairman.—S. Kenneth Davies, C.B.E.

Committee.—Capt. K. J. G. Bartlett, Capt. H. S. Broad, M.B.E., A.F.C., Air Marshal Sir Roderick Carr, K.B.E., C.B., D.F.C., A.F.C., John Cunningham, D.S.O., D.F.C., Col. W. C. Devereux, C.B.E., E. S. Greenwood, O.B.E., Capt. A. G. Lamplugh, C.B.E., Maj. R. H. Mayo, O.B.E., H. W. H. Moore, G/C. C. S. Morice, D.S.O., M.C., Maj. H. A. Petre, D.S.O., M.C., Maj. J. Stewart, O.B.E., Lawrence Swan, J. C. C. Taylor, M.B.E., C. F. Uwins, O.B.E., A.F.C., Frank Woodhead.

Since most people believe that Harold Perrin was the secretary until succeeded in 1945 by Col. Rupert Preston, the present secretary-general, it may be well to give the correct story. The foundation secretary was Claude G. Johnson, in an honorary capacity, loaned by the courtesy of the Automobile Club, of which many of the founder members of the Aero Club were also members. On April 12th, 1902, H. B. Skinner was appointed full-time secretary; he resigned on October 16th and was succeeded for a short time by E. S. Bruce, who held office until December 19th. The Club's solicitor, that ardent aeronaut C. F. Pollock, did duty for a while until, on February 17th, 1903, E. O. Pope was appointed. He was succeeded by Harold Perrin on April 3rd, 1906, and Perrin's arrival brought about a complete change in the running of the Club.

It was Perrin who brought about a move to 166 Piccadilly; until then the Club office had been in all manner of places. Next, on September 16th, 1916, it moved to 3 Clifford Street—many older members consider these to have been its happiest days—and on May 26th, 1931, the lease of the present premises at 119 Piccadilly was signed; the first official meeting took place there on September 17th, 1931.

It should be remembered that the Royal Aero Club is primarily a sporting club. This has been strictly so from a tripartite agreement of 1909, although a fourth party, the S.B.A.C., came into the picture a decade later. The division of interest in aviation was (1) sport, (2) scientific investigation, (3) national defence. The terms of the agreement were accordingly that (1) the Aero Club was the chief body for "sport and the development of the art of aeronautics"; (2) the Aeronautical Society was paramount in scientific and technical matters; and (3) the Aerial League was supreme regarding patriotic movements and public education.



From 116 Piccadilly the Club moved to 3 Clifford Street, Old Bond Street —the building seen here—in 1916. It moved to its present home in 1931.

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Left to right, Col. R. L. Preston, the present secretary-general; the late Cdr. Harold Perrin, secretary from 1906-1945; Lt.-Col. Sir Francis McClean.

The Story of the Royal Aero Club . . .

As a sporting club, the Royal Aero is the body recognised by the F.A.I. for Great Britain; but it should be remembered that today the F.A.I. itself owes much to the R.Ae.C. Originally, on the basis of the amount of gas consumed in balloons, the French dominated the F.A.I. but the disaster of occupation by Germany in 1940 brought about, eventually, a strong British influence. Today, Harold Gillman is Director-General of the F.A.I., and in the post-war revival of F.A.I. activities Lord Brabazon (president for a period), Maj. R. H. Mayo and Capt. K. J. G. Bartlett have played leading parts. Indeed, when Maj. Mayo was president of the Sporting Commission (for four years) an entirely new *code sportif* was produced, and he became the first *president d'honneur* of that Commission.

Equal in importance with the Club's F.A.I. work is that of its Racing Committee. The correct title is "Racing, Records and Competitions Committee"; it started in 1920 under G/C. C. R. Samson. Its chairmen have been Sir Sefton Brancker (1921-30); Lt.-Col. M. O. Darby (1931); Sir W. Lindsay Everard (1932-39); Air Marshal Sir John Boothman (1946-48); and Maj. R. H. Mayo (1948-51).

The function of the Racing Committee is the organization and control of air races. The Club is responsible not merely for forwarding the particulars of record attempts to the international controlling body but also for detailed supervision and official observation of all such attempts. Should even the Air Ministry, using an R.A.F. aircraft and an R.A.F. pilot or crew, decide to make an attempt on a record, it is the Royal Aero Club which would officiate over that attempt.

Whilst it is invidious to pick from a galaxy of talent and meritorious service, not only to the Club but to aviation as a whole —and, of course, especially to British aviation—two men stand out conspicuously through the years. The first is Lord Brabazon, the present president of the Club; any attempt to describe his great and continuing services would demand the whole of this issue of *Flight*. Perhaps this comment may be made: Lord Brabazon of Tara is not only a national character, he is international.

Where epic flights have come of chance remarks—the R.Ae.C. bar.

"Flight" photograph

Nevertheless, perhaps as great a debt is owed to Sir Francis McClean, aeronaut and aviator. Tribute to him is long overdue, and the time has now come to disclose verbatim the text of a confidential memorandum which Harold Perrin made to the Committee on April 28th, 1943. He wrote:

"Mention should be made here of the debt of gratitude which the Club owes to Lt.-Col. Sir Francis McClean, the owner of the Eastchurch flying ground. The Eastchurch flying ground was purchased by him in 1909, and he granted the Club a lease of it at a nominal rent of one shilling per annum. From the year 1909 to 1918 the Club expended considerable sums of money at Eastchurch on sheds, roads, etc. Sir Francis had given an option to the Admiralty to purchase the flying ground, which option was exercised by the Admiralty in 1920. Sir Francis insisted that all he should receive was the actual amount paid by him for the property. Unfortunately, he did not wish that the Club should profit by the transaction, but after many arguments which I had with him personally, I eventually persuaded him to agree to the Club being re-imbursed at least the amount of this expenditure at Eastchurch, for the period 1909-18. This magnificent gesture by Sir Francis McClean resulted in an addition to the Club's exchequer of over £9,000, out of which the Club voted £2,000 for air racing and £1,000 to the Flying Services Fund. . . ."

Perrin's memorandum does not, of course, do full justice to the debt that the nation as a whole owes Sir Francis. Perrin seems to emphasize the gift of money, but a financial transaction is the skeleton of the story: for what Sir Francis did, in the early days, was to give Naval Aviation a splendid start. A true assessment of the story would be that not the Club but Sir Francis himself set in train the long and glorious tale of the British Fleet Air Arm.

Unglamorous, perhaps, is the title Flying Services Fund; but this, started by the Club in a sporting way, was the origin of the present R.A.F. Benevolent Fund, which took over its assets and duty. It should be emphasized that the Flying Services Fund, which operated at its peak in 1914-18, financially cared for not only the dependents of members of the Club but for anyone who in aviation had paid the price of war.

Notable modern activities of the Club are covered by the Kemsley Flying Trust: Lord Kemsley has placed £100,000 to the advancement of British aviation. By the beneficence of the late Lord Londonderry, his splendid town house in Park Lane is now the Aviation Centre, and is much used by associate members who, for a modest annual subscription, have the use of something that far surpasses anything of the kind in London.

The Club is fortunate in having as its secretary-general Col. Preston, son of Admiral Sir Lionel Preston, K.C.B. It is almost a secret, but Col. Preston originally tried to join the Navy; the doctors faulted him for a slightly defective eye. Somehow, he managed to fox the Army doctors, joined the Coldstream Guards in 1922, and served with the brigade until December, 1945. Duncan Davis taught him to fly in 1925, and in 1928 he was a King's Cup entrant and pilot. He joined the Royal Aero Club in 1924; became a member of the Touring Committee in 1932; of the Racing Committee in 1937; and of the Main Committee in 1938. Probably no more happy association exists than that of the secretary-general and the chairman of the Main Committee, Mr. Whitney Straight, who is as popular as he is well-known.

The Club enters its second half-century vigorous, sound, and, unlike many other clubs, with a nicely graded membership extending from pioneers to practitioners, from practitioners to pupils. If there can be great cause for pride in the pioneers there is, equally, great inspiration for Youth, which must one day take over the illustrious torch that will be handed on.

"Flight" photograph

Comfort and dignity without "stuffiness"—the R.Ae.C. members' lounge.

The Story of the Royal Aero Club . . .

"FELLOWSHIP OF THE AIR"

WITH the Royal Aero Club's 50th jubilee in mind, the Main Committee requested me, at the beginning of last year, to compile a history of the Club. The task is now finished, and Iliffe and Sons, Ltd., the publishers of *Flight*, expect to have the book ready for sale early in September.

An experienced historian is aware of one thing from the start: that he will make mistakes. No matter how carefully the checking is done, no matter how many people read the MS and proofs, the wretched author knows that on receiving his first copy he will open the book and lo! standing out with a horrible grimace is some sort of mistake. He then buries his head and waits for the inevitable letters, some kindly, some patronising, some abusive.

In this particular history quite unexpected research difficulties were encountered. For eight months the entire minute-books from 1901 to early 1910 were missing. On a vain quest, Col. R. L. Preston, secretary-general of the Club, and myself one Saturday morning donned our oldest clothes and spent nearly three hours in the vaults beneath 119 Piccadilly, rummaging through scores of documents of unbelievable diversity—but we found not a single thing of value to the book—though 18 sacks of forgotten papers were sent away for pulping.

The worst of luck attended other efforts to trace forgotten events. Maj. S. V. Sippé, for instance, recalled that in 1928 or thereabouts he had deposited three trunks packed with mementos, souvenirs, records and so on at the baggage room, Waterloo Station. He had gone abroad in a hurry and forgotten about them. On enquiry, British Railways informed me that after seven years such deposits were automatically disposed of; in the case of papers they were generally destroyed. O shame, shame, shame!

Harry Delacombe, again, in a clearing-up fit after the 1914-18 war actually burned a whole pile of records—and has bitterly regretted that deed ever since. Sir Francis McClean had wretched luck: his house at Henley was commandeered by the military, and in sundry moves during the upheaval of war he lost sight of many of his records. And so with many—too many—others.

Altogether, 240 letters of enquiry were sent out to people famous in aviation: about 40 did not reply, about 150 answered that they had always enjoyed themselves but had nothing to say, and about 30 gave information on aircraft or the R.F.C. and R.N.A.S., or on other matters not directly within the province of the Club. The balance of 20 produced results. Of these, particular mention must be made of Mr. H. Oswald Short, who contributed no fewer than 42 pages of manuscript in almost copper-plate handwriting! Much of the information received was given colour by personal explanations from Lord Brabazon and Mr. Claude Grahame-White, to both of whom I am especially indebted.

The chief sources of information were the Club minute-books and the Hedges Butler Collection. Frank Hedges Butler, with his daughter Vera (now Mrs. Nicholl) and the Hon. C. S. Rolls founded the Club, and his collection of Press cuttings and souvenir programmes, etc., runs to 22 volumes, each of large guard-book size and each of 115 folios. In all, some 24,000 cuttings were examined in this collection alone. Lord Brabazon has a similarly large collection; but much of his concerns motoring, ski-ing, politics and so on. Mr. Cyril Griffith Brewer has the record-books of his famous father.

The minute-books proved deceptive. The Main Committee's proceedings kept the thread of the story strong, but had to be read in conjunction with many special and sub-committee records. How great some of these subsidiary committees can be is shown by the Racing Committee records, which in the years 1947-50 alone amounted to some 200,000 words! The Schneider Races, of which the "inside story" has never before been revealed, produced enough documents to cover an ordinary desk to a height of three feet; and this chronicler would like to pay particular tribute to the work of the late Cdr. Sir James Bird; his son John, who served in the Fleet Air Arm during the war and reached the rank of lieutenant commander, placed at my disposal more than 500 photographs, whilst dear old Victor Paine, who was for so long with Vickers, turned up trumps again with other material. Maj. R. H. Mayo produced an entirely new angle to the famous Alcock and Brown transatlantic flight, and gave invaluable assistance concerning the Racing Committee (of which he is chairman) and the F.A.I.

It was not known, when the task was begun, how much of a book the story would make; much of it seemed straightforward, but deceptively so. Being thus in the dark, we decided to let the story "run"; and it eventually ran to 115,000 words. This, with numerous illustrations, would have made a formidable volume indeed; and it was therefore decided with the publishers, who are still, of course, governed by paper shortages, to reduce the text to 80,000. Perhaps on the 75th or 100th anniversary of the Club some other author will produce then an up-to-date version; and to this end the original MS has been presented by me to the Club for free use in due course.

The Main Committee appointed a special sub-committee to supervise this matter. The chairman was Air Chief Marshal Sir Roderick Carr, and he was supported by Sir Francis McClean, Maj. R. H. Mayo, G/C. C. S. Morice, Mr. H. W. Moore and Col. R. L. Preston. With trepidation the MS was submitted to their scrutiny; then, with thanks, many suggestions and clues were accepted—especially the painstaking work of Sir Francis McClean, for the early days, and Maj. Mayo for the later.

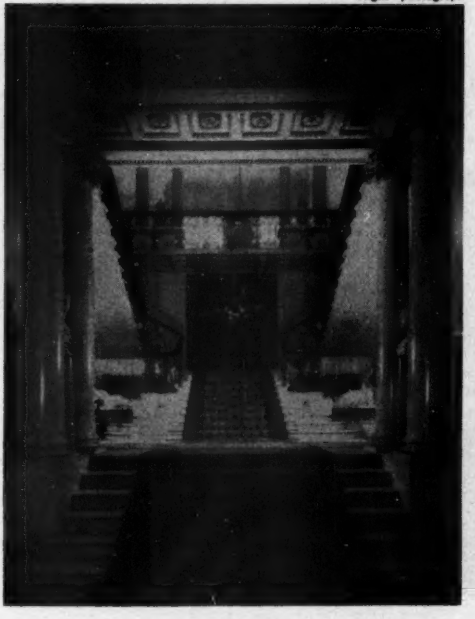
Alas, many good stories intended for the book fell by the wayside. One which I found particularly intriguing came from Capt. W. E. ("Biggles") Johns, who, on a fleeting visit to London, was in fine form. It seems that Johns, when editor of *Popular Flying*, now defunct, visited Germany at the time of the Munich crisis, in September, 1938. There he saw Willi Messerschmitt and Goering. Asked how many Me109 fighters (the equivalent of our Hurricanes) there were, Willi replied that the *initial* order was for 3,000—implying that many more were to be expected.

Johns printed this news from Augsberg, whereupon the Air Staff refused to believe not only the news but that Johns had ever seen Goering—until Johns described in minute detail how he had participated in a pistol-shooting competition *in Goering's private flat*.

I have heard or read many such anecdotes during my writing of *Fellowship of the Air*; and if I say that they have served to lighten the task I do not mean that compiling this fifty-year story has not been a particularly pleasurable kind of hard work.

In Londonderry House, the fine home of the R.Ae.C. Aviation Centre.

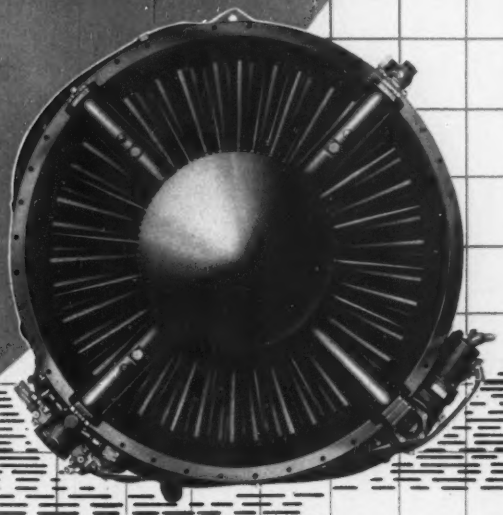
"Flight" photograph



ARMSTRONG SIDDELEY GAS TURBINE DEVELOPMENT

small frontal area is one result of the annular combustion chamber

thrust per unit of frontal area = 950 lb per sq ft



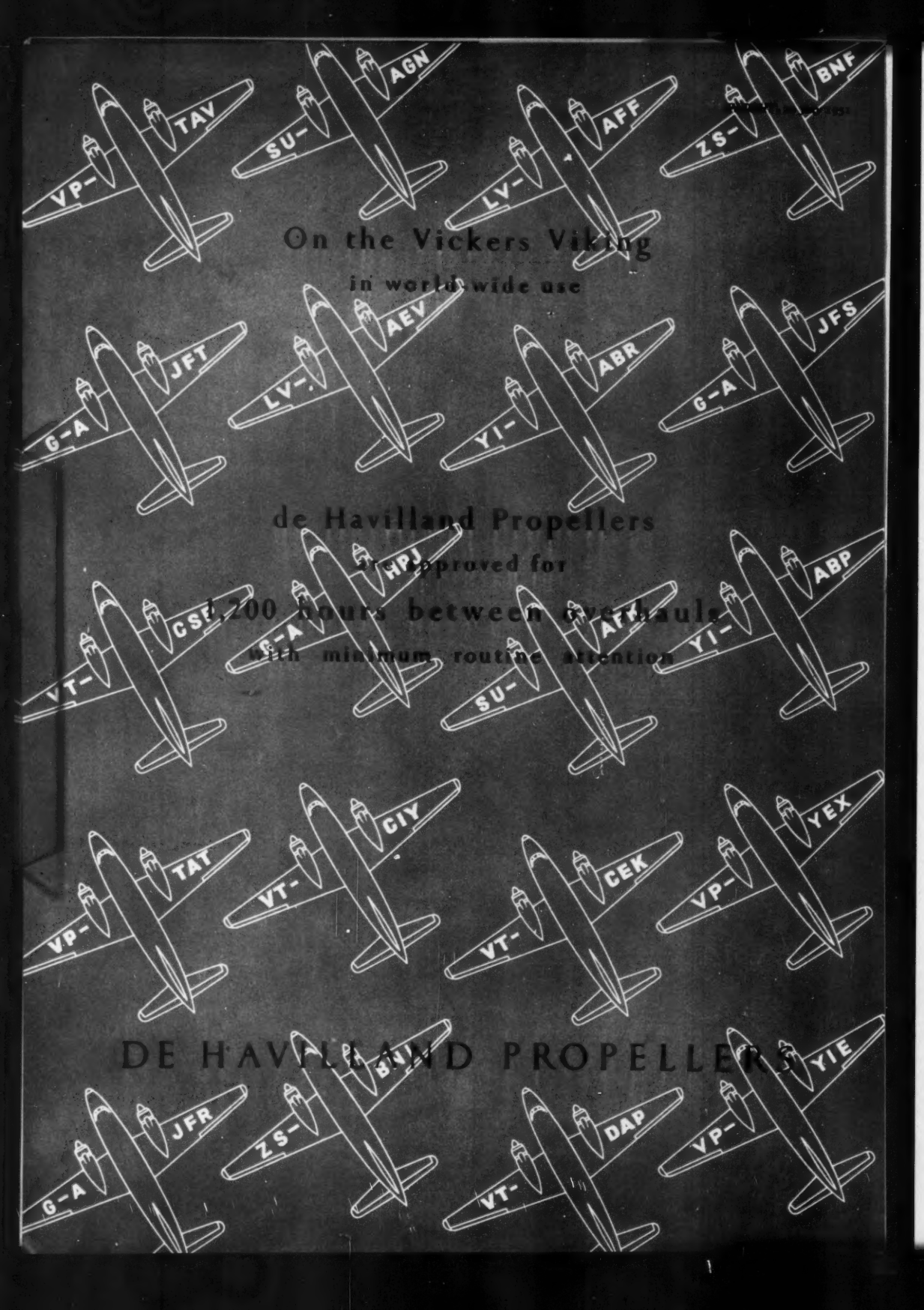
Armstrong Siddeley

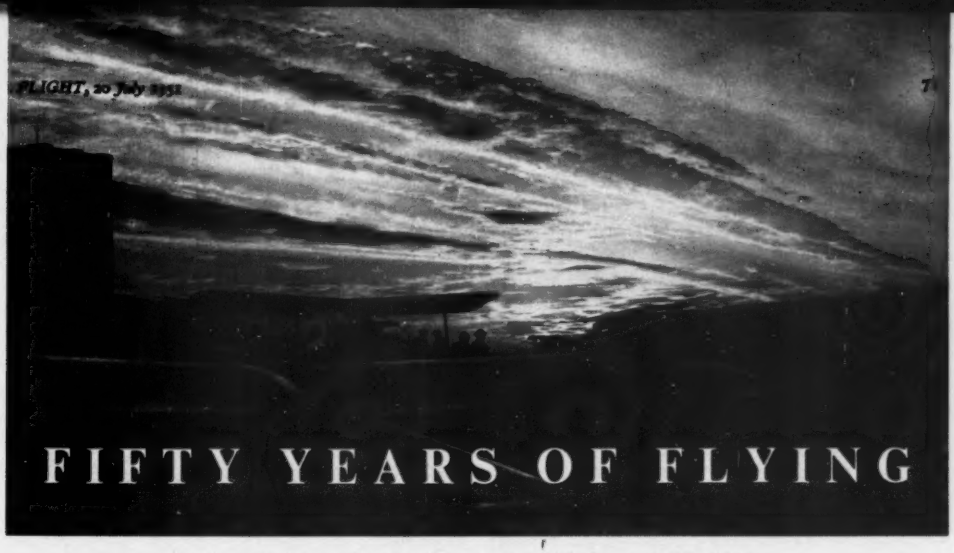
Sapphire

POWER PERFORMANCE

ALREADY 7,200 lb THRUST

ARMSTRONG SIDDELEY MOTORS LIMITED, COVENTRY • Member of the Hawker Siddeley Group


On the Vickers Viking
in worldwide use
de Havilland Propellers
approved for
1,200 hours between overhauls
with minimum routine attention
DE HAVILLAND PROPELLERS



FIFTY YEARS OF FLYING

An Outline of British Aviation History, 1901-1951

Illustrated mainly with "Flight" photographs

By J. W. R. TAYLOR

WHEN the Aero Club of the United Kingdom was founded 50 years ago, flying was little more than an expensive and rather hazardous sport. A few balloons had been used in war for observation duties and even as pilotless aerial bomb-carriers; but, obviously, they could never be made into satisfactory vehicles for getting from A to B, and the long-awaited successful flight of a piloted, powered aircraft seemed as far off as ever.

There had been no lack of would-be aviators in Britain during the nineteenth century, but theory had outstripped practice, largely through lack of a suitable power-plant. This prevented the more adventurous characters from taking advantage of the aerodynamic discoveries of Sir George Cayley, Francis Wenham, and Horatio Phillips. Nevertheless, some progress was made. Cayley flew the world's first proper aircraft, a model glider, in 1804. Henson designed his remarkable Aerial Steam Carriage 38 years later, and this in turn led to Stringfellow's steam-driven model, which made the first flight by a powered aircraft. Sir Hiram Maxim came even nearer to success in 1894, when his giant 3½-ton steel-tube aircraft, driven by two 180 h.p. steam engines broke free from its retaining rails during tests at Bexley, in Kent, and made a brief but uncontrolled flight before crashing.

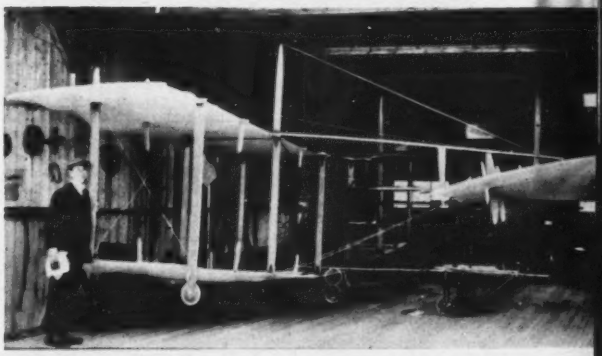
Sir Hiram decided that he could not afford to carry his experiments further. Thus, at the turn of the century the balloon still dominated the aeronautical scene, and the Aero Club was founded primarily "to grant certificates of competency to Members who, having made a sufficiency of ascents, are recognised as competent to take control of a balloon; and to organize Congresses, Exhibitions, Races and Contests." But, with an eye on the future, the founders of the Club—Frank Hedges Butler, his daughter Vera, and the Hon. C. S. Rolls—were careful to ensure that membership was open also to any scientist or enthusiast interested in "the science of aerial navigation in all its forms and applications," a definition which covered a multitude of interests.

This was just as well, for within a couple of years of the Club's formation, two bicycle-makers of Dayton, Ohio, knocked the first nail into the balloon's coffin by making a flight of 12 seconds in a powered stick-and-string biplane at Kitty Hawk.

The aeroplane had arrived, but it was three years before Europe, or even America, realized the significance of the Wright Brothers' achievement, and during that time interest still centred chiefly on the balloon and airship. The hero of the hour was the great Brazilian pioneer, Alberto Santos-Dumont, who achieved fame and a prize of 125,000 (1901-type) francs by flying his airship from St. Cloud, round the Eiffel Tower in Paris and back to his starting point.

Quite naturally, the Balloon Section of the Royal Engineers, which had been formed in 1890, was interested in these developments, and the Superintendent of the Balloon Factory at Aldershot, Lt.-Col. J. L. B. Templer, went to Paris to find out all about Santos-Dumont's airships. On his return, he extracted £6,000 from the Treasury to conduct similar experiments in Britain. This covered the cost of the envelopes for two airships, but no engines, so work came to a temporary halt in 1904.

In that year, Col. J. E. Capper (who was, in 1906, to succeed Col. Templer as Superintendent) went to the States



The original A. V. Roe biplane in its shed at Brooklands, with the great "A. V." himself. (Below) "Moore-Brab" in the Short No. 2 gets away to complete the first British circular mile at Shellbeach in 1909

The great Anglo-American designer-pilot, Colonel S. F. Cody, poses for "Flight's" cameraman aboard his massive Cathedral biplane.

FIFTY YEARS OF FLYING . . .

to try and persuade the Wright Brothers to continue their experiments in this country, but the Treasury refused to provide the necessary finance, and so the Wrights stayed in America. As a result, the Factory was obliged to use home-produced talent, and several names that were later to become famous entered the story at this stage, including S. F. Cody, Lt. J. W. Dunne, and the town of Farnborough, to which the Balloon Factory and Balloon Section of the Royal Engineers moved in 1905.

From the start Farnborough was a centre of British aeronautical research, its first experimental and training work covering such things as spherical and elongated balloons, aircraft engines, kites, aerial photography and signalling devices. The Man-lifting Kite Section had been formed in 1894 under Capt. B. F. S. Baden-Powell, but it did not come into prominence until 1906, when "Colonel" S. F. Cody was appointed Chief Instructor in Kiting. Until his death in an aircraft accident seven years later, this colourful figure with the goatee beard, and long hair sprouting from under an enormous Stetson hat, remained a dominant figure in British aviation, combining rare skill and courage with a flair for showmanship that was displayed not only in his personal appearance but in stunts such as crossing the Channel in a small boat towed by several of his kites. Although unrelated, he traded on the publicity value of his famous namesake and fellow-American, Col. "Buffalo Bill" Cody, and was to be seen astride a richly-saddled white horse almost as often as on the pilot's seat of an aircraft.

Dunne was an entirely different character—a brilliant metaphysicist (and, later, author) who decided that the proper way to build an aircraft was on the swept-wing, tailless formula—not with an eye to future compressibility worries (!) but because tests with paper models had shown that such a layout offered inherent stability, at a time when "balance" was the would-be aviator's biggest headache. His story, too, has a touch of Dick Barton, for, realizing the potential military value of an inherently stable aircraft, the War Office decided to hide Dunne's experiments under a veil of official secrecy. As a result, one day in 1907 a party of men from the Farnborough Balloon and Kite Section were put into civilian clothes and packed off to the Duke of Atholl's estate at Glen Tilt, Blair Atholl, complete with Dunne's first full-size aircraft, the D.1, fitted with two 12 h.p. Buchet engines. As the Duke was by tradition allowed to maintain a private army, there were no fears of unwanted observers.

The D.1 proved the soundness of Dunne's ideas and was followed by further machines on the same principle; the D.3 was constructed at Farnborough and later ones built privately at Eastchurch. In addition, both seaplane and flying-boat versions of the Dunne biplane were built in America by the Burgess Company. But it gradually became apparent that inherent stability was not so essential for a military aircraft as good manœuvrability and the Dunne formula was virtually forgotten until a few years ago, when a new breed of swept-wing, tailless aircraft came into being for rather different reasons.

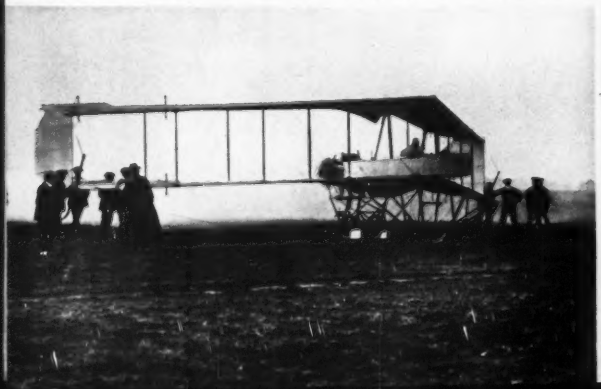
While Dunne was busy at Blair Atholl, Cody, too, was making progress. As a start he helped Col. Capper complete one of the 1904 airships—the *Nulli Secundus*—as the first British military airship. It flew successfully in September, 1907, marking the start of a seven-year period of airship development at Farnborough. But Cody was more interested in aeroplanes and before long had fitted a 12 h.p. Buchet engine to one of his kites, and had flown it successfully, minus pilot.

The next step was, obviously, to build a full-size piloted version of the same thing. Cody was allowed to power this with a 50 h.p. Antoinette engine originally intended for the unsuccessful *Nulli Secundus II*, and he arranged it to drive two pusher propellers; the result looked something like the Wright biplane. It was in this aircraft that Cody made his first hops in May, 1908, on Laffan's Plain. On October 5th of the same year he made the first official flight in a piloted aeroplane in Great Britain—a measured distance of 496 yards at a height of 50-60 ft.

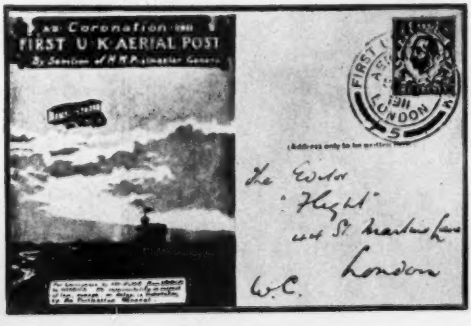
Six months later the War Office decided to abandon all work on aeroplanes as the cost—a total of £2,500 to that time—was considered to be too great. By comparison, in that same year of 1909, Germany allotted a total of something like £400,000 to military aircraft development and production.

Fortunately, British aeroplane development did not come to a full stop, as "private enterprise" had come into the picture by then. In one sense, of course, it had been there for some time past: every year saw its quota of weird and wonderful flying machines, built by enthusiasts whose normal trades ranged from making pianos to basket-weaving. The results often appeared to incorporate a selection of the maker's stock parts and few of them achieved even a pilotless hop; but from the multiplicity of inventors there did emerge a few who were to win a place in British aeronautical history. Such a man was Henry Farman, whose circular flight of more than one kilometre on January 13th, 1908, to win the Deutsch-Archdeacon prize of £2,000 marked the start of *practical* flying in Europe, some two years after Santos-Dumont had made the first flight in a powered aircraft on this side of the Atlantic.

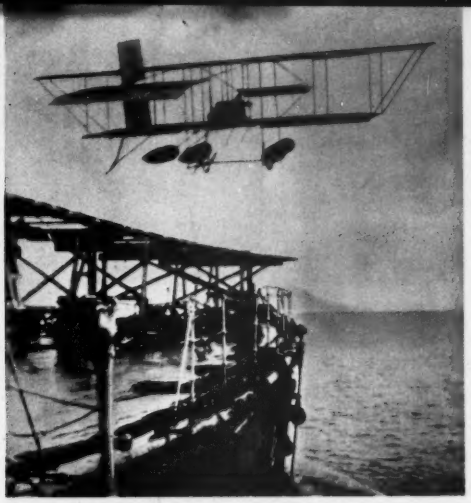
Aviators were still being ridiculed in Britain at that time, and a prominent member of the Aero Club, J. T. C. Moore-Brabazon, advised his fellow enthusiasts to follow Farman's example and transfer their activities to France. He took his



One of the series of Dunne tailless, back-swept biplanes, built at Eastchurch and possessing a very high degree of natural stability.



The first aerial post in the United Kingdom: a cover carried by Gustav Hamel on the famous London-Windsor flight (September 9th, 1911)



Naval aviation in 1912: Cdr. Samson, in a modified Short S.38, taking off from the battleship "Hibernia" steaming at 15 knots.

own advice by buying a Voisin "box-kite" and learning to fly it in France; so did Hubert Latham, who had been born in Paris of an English father, and later achieved fame with his gallant attempt to make the first Channel crossing in an aeroplane.

One young Englishman who braved the critics at home was Alliott Verdon-Roe, whose interest in aviation dated from 1902. Four years later he travelled to the States on behalf of a Mr. Davidson, who was interested in building a remarkable helicopter with no fewer than 240 blades. Apparently Roe was not very impressed with its possibilities, being convinced that fixed-wing aircraft were more practical. He had an opportunity to prove his theories next year, when the *Daily Mail* staged a flying competition for model aircraft at Alexandra Palace, with prizes totalling £250. Roe entered three models, one of which proved to be the only entry able to exceed the qualifying distance of 100 ft. With his prize-money he started to build a man-carrying version of the successful model, in the hope of winning £2,500 offered by the management of Brooklands to the first aviator who flew round the track before the end of 1907. Despite this apparent generosity, little co-operation was offered to pilots who wished to settle-in at Brooklands. For example, after erecting his primitive hangar in an agreed position near the judges' box, Roe was ordered to move it to a less obtrusive spot and to paint it dark green. Then he was asked to make it available as an extra refreshment room during motor racing. On such occasions his aircraft had to be out of the way before anyone turned up with a car, so he had to start work at dawn; yet he was forbidden to sleep in the hangar. As a result, he usually said "Good-night" to the gatekeeper, walked out and then climbed back over the fence.

It was soon clear that the little 9 h.p. J.A.P. engine of his biplane was powerful enough only for taxying, so he hired a 24 h.p. Antoinette, which arrived early in 1908. To pay for it, Roe lived on about 5s. worth of food a week, but it was worth it, for on June 8th, 1908, the new engine enabled him to claim later that he had made the first aeroplane flight by an Englishman in England, Cody having been an American national at the time of his earliest flights. Roe's achievements were, unfortunately, too late to win the £2,500. Even worse, when claims for the distinction of making the first British-powered aeroplane flight were considered officially by the Royal Aero Club 21 years later, it was decided that his early efforts were only hops and not proper sustained flights; the committee accepted the claim of Moore-Brabazon who, in May, 1909, flew a distance of 500 yards in his Voisin.

In 1908, however, there were more serious worries to plague the pioneers. Roe, for example, was first thrown out of Brooklands and then "warned off" Lea Marshes, where he went to continue his experiments and where, in fact, he made the first flight in an all-British aeroplane, on July 13th, 1909. The triplane with which he accomplished this feat is today one of the prized exhibits in the National Aeronautical Collection. It has a 9 h.p. J.A.P. engine, as "A.V." had to return the Antoinette through lack of capital, and is covered with yellow cotton-oiled paper. Yet it made several very successful flights.

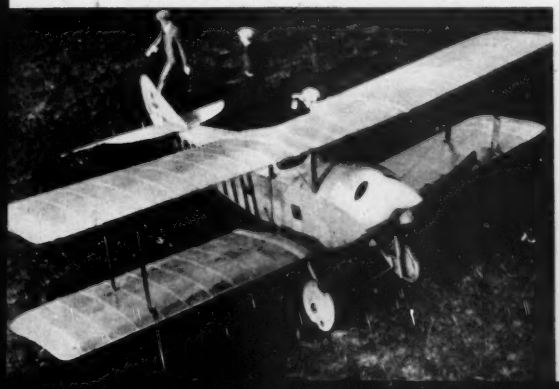
The local authorities at Lea Marshes remained unimpressed, but just as they were about to take Roe to court as a public menace, Bleriot flew the Channel, winning a *Daily Mail* prize of £1,000. This put them on the spot, for in the face of such a demonstration of the aeroplane's potentialities, it would have seemed somewhat incongruous to charge a British pioneer with a "crime" of the kind that had brought world-wide fame to a Frenchman. So the case was dropped, and before long aviators began to be recognized as comparatively harmless members of the community.

From then on, events moved quickly. The world's first flying meeting at Rheims was followed by similar events at Blackpool and Doncaster, which were, unfortunately, arranged to open on the same date, and were dogged by bad weather. Nevertheless, both Farman and Latham made outstanding flights at Blackpool, while Cody distinguished himself with a cross-country flight of 47 miles from Doncaster.

He had become by that time a naturalized Englishman, so decided to try and win a *Daily Mail* £1,000 award for the first British pilot to complete a circular flight of one mile in an all-British aeroplane. But he was forestalled by Moore-Brabazon, who flew a "Short No. 2" biplane produced at Shellbeach by the brothers Short, who had been appointed official balloon-makers to the Aero Club in 1907 and had later started in the aeroplane business by taking on production of the Wright biplane. This marked the start of the British aircraft industry, for Shorts were soon followed by Handley Page and A. V. Roe and Co., while the Humber Motor Company began to build Bleriots under licence.

Much credit for fostering public interest in aviation in Britain must go to the *Daily Mail*, whose series of valuable cash prizes also provided designers with an incentive to continue their work. By 1910, progress had become so rapid that aviators were able to make serious plans for winning the prize of £10,000 offered in 1906 by the *Daily Mail* to the first airman to fly between London and Manchester within

The tiny Sopwith Tabloid of 1913 (a cleaned-up racing version of which is shown) established new standards of aerodynamic efficiency.



The Sopwith Sparrow or "A.T." (signifying the cover-name "aerial target"). This was the world's first radio-controlled pilotless aircraft.

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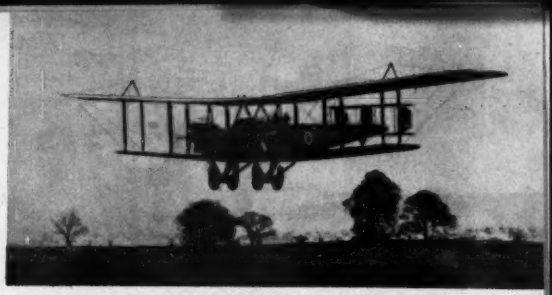
24 hours and with not more than two stops. The contest developed into a straight fight between Claude Grahame-White, who had just bought a plot of land for an airfield at Hendon, and the famous French pilot, Louis Paulhan. Both entered Farman biplanes equipped with the new 50 h.p. Gnome engine, which revolutionized aviation development in the next few years by giving designers for the first time a small, reasonably powerful and reliable power unit.

The well-known story of how Paulhan won the race, despite Grahame-White's courageous attempt to catch him by making the first recorded night flight, is one of the epics of aviation history. Other fine flights followed quickly. On June 2nd, 1910, the Hon. C. S. Rolls, one of the founders of the Aero Club, completed the first two-way crossing of the Channel; in his Short-Wright biplane he made the double journey without landing, and over Calais he dropped a letter addressed to the Aero Club of France. A month later he was killed in an aeroplane accident—the first Englishman so to die. Fortunately, some years before he was killed he had formed a business association with Henry Royce, the great engineer, so bringing into being an organization that was to do such great service to British aviation in the future.

While all this was happening, a young man named Geoffrey de Havilland had been busy building aeroplanes with funds from a benevolent and far-sighted grandfather. Unfortunately, soon after he had achieved considerable success with his second machine, the money ran out, threatening an early end to his aviation career. But at the opportune moment, the Balloon Factory at Farnborough decided to buy his de Havilland No. 2 for £400 and to give him a job as draughtsman-cum-test-pilot. Being a pusher biplane like the Farman, de Havilland's aircraft was given the official designation F.E.1 (Farman Experimental No. 1). After quite a lot of flying it was wrecked, rebuilt with a Gnome instead of its original 45 h.p. de Havilland Iris engine and redesignated F.E.2.

Simultaneously, the Factory re-started serious aircraft design work, under the direction of Mervyn O'Gorman. It was all very unofficial, because they were authorized only to repair a crashed experimental 60 h.p. E.N.V. Blériot monoplane, which was colloquially and not without reason known as the "man-killer." By the time the "repair" work was finished it had turned into a tail-first biplane classified S.E.1—the "S" standing for Santos-Dumont, in deference to the inventor of the tail-first formula. (As the S.E.1 was the only tail-first type built by the Factory, the letters S.E. were later taken to mean Scout Experimental.) Faced with a *fait accompli*, the War Office wound up the Balloon Section R.E. on April 1st, 1911, and replaced it by the Air Battalion; three weeks later they renamed the Balloon Factory the Army Aircraft Factory. One of the Factory's first jobs was to "repair" the Duke of Westminster's Voisin pusher biplane, which emerged as the B.E.1 (Blériot Experimental No. 1) tractor biplane, designed by F. M. Green and "D.H."

At the same time, it was decided to inaugurate the designations R.E. (Reconnaissance Experimental, two-seat tractor biplane), T.E. (Tatin Experimental monoplane with pusher propeller at tail), and B.S. (Blériot single-seat Scout) for future use. "B.E.", "R.E." and "S.E." were to become famous.



The Handley Page O/400, which was the subject of Capt. Murray Sueter's memorable remark to its maker, quoted by the author of this article.

It was obvious by this time that the War Office intended Farnborough to become the centre of military aircraft design and production in Britain, with private companies getting only crumbs from the rich man's table, in the form of sub-contract and production work for the Factory. This created a good deal of ill-feeling, as private enterprise had contributed much to British aeronautical progress and our aircraft industry was beginning to develop along promising lines. For example, Bristol Box-kites were accepted as being among the most efficient training aircraft in the world, while Shorts had enhanced their prestige by building the world's first twin-engined aeroplane, a biplane with two 50 h.p. Gnomes. Nor was aviation regarded any longer as merely a sport. In India, for example, Capt. (later Sir) Walter Windham organized the world's first official air-mail service in 1911—an experiment which paved the way for the famous Coronation Air Mail service later the same year, when no fewer than 100,000 letters and cards were carried between Hendon and Windsor by pilots from the Blériot and Grahame-White schools at Hendon.

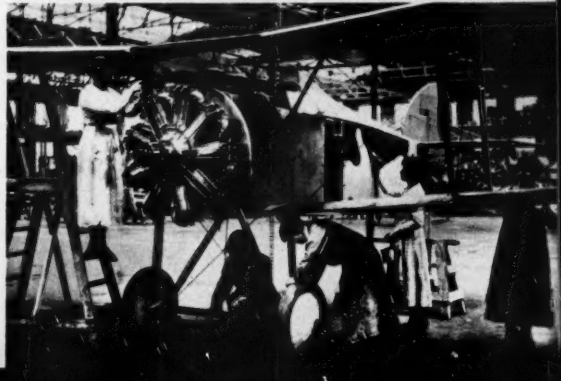
The military possibilities of the aeroplane were not appreciated so quickly, although a Bristol Box-kite had been used for reconnaissance during Army manœuvres on Salisbury Plain in 1910, and the first experiments with air-to-ground radio had already been completed successfully at Farnborough.

By the end of 1911, however, activity on the Continent forced the Government to appoint a committee to consider the whole question of military aviation. As a result of its recommendations the Royal Flying Corps came into being on May 13th, 1912, with Military and Naval Wings. This was most satisfactory for, although the War Office continued to put all its faith in standardization, the Navy decided from the start to buy the best aircraft available, whether they were produced at the re-named Royal Aircraft Factory at Farnborough or by private industry.

Naval interest in aviation dated from 1908, when the Admiralty ordered the airship *Mayfly* from Vickers. True to her name, she did not fly, but the effort was not altogether wasted, for one of the naval officers who had taken part in the airship experiments, Cdr. Oliver Schwann, filled in his time by building the first British seaplane—a converted Avro. In November, 1911, at Barrow, it left the water but capsized shortly afterwards. More successful flights were made a few weeks later by Col. Stanley-Adams, flying a Curtiss-type "hydro-aeroplane" built by A. V. Roe and Co.

One of the great fighting scouts of the Kaiser's war: the S.E.5a, designed by the Royal Aircraft Factory. Armament, one Vickers, one Lewis gun.

The ladies prepare a Sopwith Salamander trench-strafer for the fray. Protective armour plate forms the cockpit walls; the guns are Vickers.



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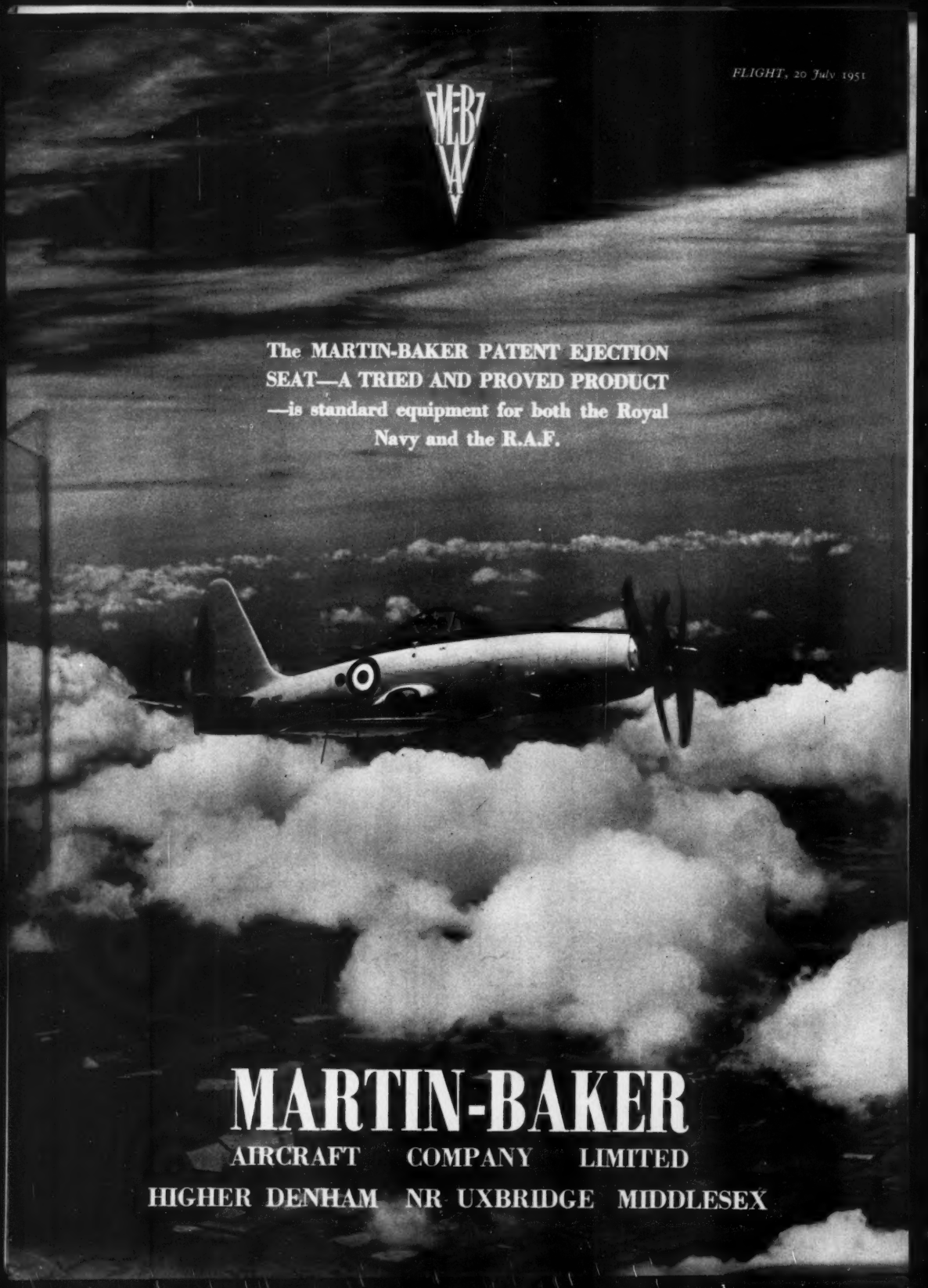
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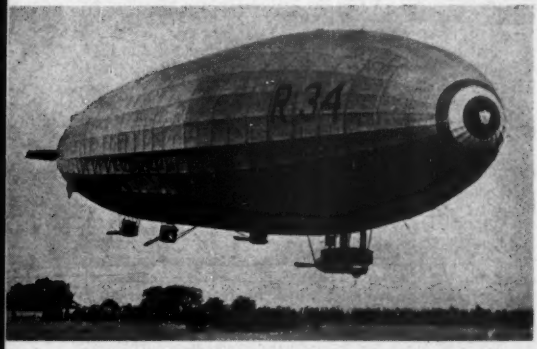
FIFTY YEARS OF FLYING . . .

To their credit, the Admiralty were already by that time concerned about the menace of German submarine forces in any future war, and were quick to appreciate the possible value of seaplanes for anti-submarine work. During 1912, they conducted experiments which showed that seaplanes could be used effectively for spotting and attacking submarines from the air, as well as to co-operate with naval units by radio communication. From that moment experiment and training in radio and bomb-dropping were given priority in the Naval Wing. One consequence of this was the first successful British launching of a torpedo from the air, by Lt. Longmore, flying a Short seaplane, in July, 1914.

Longmore (now Air Chief Marshal Sir Arthur) was one of the four original Naval aeroplane pilots who were trained at Eastchurch in 1911, through the generosity of Sir Francis McClean; but from August, 1912, both military and naval pilots were trained together at the newly-formed Central

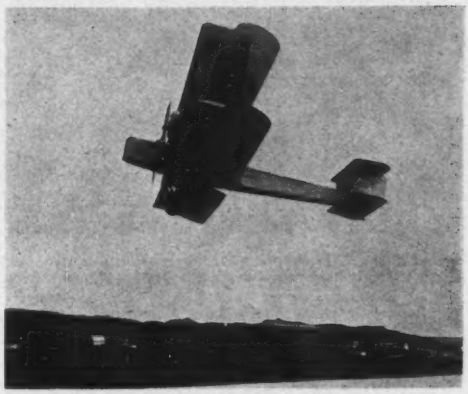


H.M. Airship R.34, first lighter-than-air craft to cross the Atlantic.

Flying School at Upavon, starting on Maurice Farmans, and graduating on to the Avro tractor biplane or B.E.2. Typical of the assortment of aircraft then in service is the list of machines allocated to No. 3 Squadron R.F.C. at Larkhill; it included one Nieuport, one Déperdussin, one Bristol and two Blériot monoplanes, one Avro biplane and a Bristol Box-kite. By September, 1912, the same squadron had a total of 14 monoplanes and four biplanes. Then, following a series of accidents, came a War Office ban on monoplanes, which retarded the development of this type of aircraft for 20 years, and resulted in "No. 3" being reduced to an effective strength of four aeroplanes.

It is possible that the monoplane would have been discarded in any case, for hard on the heels of the highly successful Avro 504 came T. O. M. Sopwith's little single-seat Tabloid biplane, which set completely new standards of aircraft performance by flying at 92 m.p.h. on only 80 h.p. Except for the Factory-built B.S.1 single-seat scout, nothing like the Tabloid had ever been seen before; and when a seaplane version, piloted by Howard Pixton, won the second contest for the Schneider Trophy at Monaco in 1914 it put Britain right in the forefront of world air progress. Nor was aviation a hit-and-miss process any longer, for wind-tunnel testing had been inaugurated at Farnborough as early as 1907, and in 1913 it had been supplemented by sandbag structural overload tests. Simultaneously, the basic principles of aircraft stressing and inspection were worked out at the Factory, which continued to produce new aircraft designs and engines, as well as a wide variety of specialized instruments and equipment.

Most important of the aircraft were the B.E.2c and F.E.2b both of which went into large-scale production for the R.F.C. But few were more interesting than H. P. Folland's little S.E.4 scout, which set up an unofficial world speed record



Alcock and Brown's Rolls-Royce-engined transatlantic Vickers Vimy leaving Newfoundland, June 14th, 1919.

of 131 m.p.h. and incorporated such novel features as variable-camber wings, fan-cooling for its 160 h.p. double-row Gnome engine, an N.A.C.A. cowling, enclosed cockpit, single I-type wing struts, streamlined bracing wires, and fairings on its axle and wheels and over the aileron, elevator and rudder gaps.

Unfortunately, when the R.F.C. went to war in August, 1914, it had nothing so advanced as the S.E.4, although the War Office had admitted nearly a year earlier that it might be necessary to fit aircraft with guns to enable them to carry out their reconnaissance in the face of enemy air opposition. At the end of 1913 a Farman of No. 3 Squadron was sent to Shorncliffe for firing practice with various types of machine-guns. Despite this, none of the aircraft in service with any

The fuselage of the Short Silver Streak (above) was the first all-metal monocoque structure of its kind.

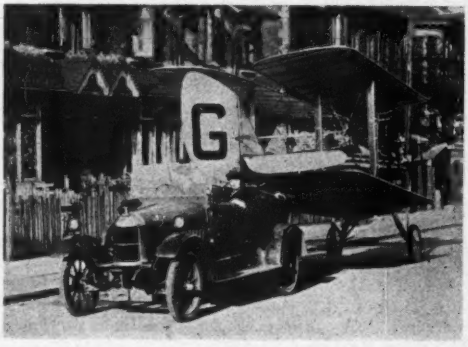
of the belligerents at the outbreak of war carried anything more lethal than a revolver or rifle, dependent on the crew's individual preference.

For the record, No. 2 Squadron of the R.F.C. went to France equipped with B.E.2's; No. 3 with Blériots, Henry Farmans and Tabloids; No. 4 with B.E.2's; and No. 5 with Farmans, Avro 504's and B.E.8's—a total of 63 aircraft, 105 officers and 95 M.T. vehicles.

Meanwhile, the Naval Wing was not functioning very happily as a section of the Royal Flying Corps, and when Winston Churchill, himself a keen airman, became First Lord of the Admiralty, he was persuaded to back a "separationist" movement. As a result the Royal Naval Air Service came into being on July 1st, 1914, entirely separate from the R.F.C., and under the direct control of the Air Department of the Admiralty, headed by Captain (now Rear Admiral Sir) Murray Sueter. Thanks to the Admiralty policy of supporting private enterprise, it had been able to acquire several promising prototypes, including the Sopwith Bat Boat amphibian, various Short and Sopwith seaplanes, and a few

Interior of the Bristol Pullman. This big transport was built from components of a Braemar bomber and was shown at Olympia in 1920.

An early Cierva Autogiro, a type of aircraft developed to a high pitch in Great Britain. Cierva's first demonstration in England was during 1926.



The original de Havilland Moth, of 1925, with 60 h.p. Cirrus engine, on tow behind an equally famous car—the "bull-nosed" Morris-Cowley.

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Tabloids. In addition, it had a rather better idea of what it would be called upon to do in the event of war. But ideas and prototypes are not sufficient in themselves to win battles, and its offensive power was little better than that of the R.F.C.

Nevertheless, there is little doubt that the R.N.A.S. made good use of the equipment it had. A small unit was sent to Dunkirk on September 1st, 1914, to pin down German Zeppelin forces, and on September 22nd four of its aircraft opened the British air offensive by raiding Zeppelin sheds at Cologne and Düsseldorf. They did little damage, but on October 8th a Naval Tabloid piloted by Sqn. Cdr. Spenser Grey dropped bombs on Cologne railway station, while F/L. R. L. G. Marix flew another to Düsseldorf, where his 25 lb bombs, dropped from a sort of pipe-rack on the side of the fuselage, not only destroyed a Zeppelin shed, but also the new and highly secret Zeppelin ZIX which was inside.

Meanwhile the R.F.C. had received its first fighters, in the shape of Maurice Farman Shorthorns of No. 4 Squadron, each fitted with one machine-gun. Unfortunately, they had such poor performance that they could often make no headway against the prevailing wind when returning from flights over the enemy line, and were easy prey for flak—or, as enemy A.A. fire was then known, "Archie." As a result, their pilots usually stripped off every ounce of surplus weight before take-off—including the gun.

This was highly unsatisfactory as, although aerial reconnaissance remained a most important and useful function of the R.F.C. throughout the 1914-18 War, it was obvious by the end of 1914 that air fighting would soon be the primary duty of military aircraft. So the War Office decided to speed up production of specialized fighters. Despite the proven superiority of the Tabloid for "scout" duties, they decided to standardize on two-seat pushers, as no one had yet found a way of firing bullets through the airscrew disc, and it was contended that a pilot had enough to do flying the aircraft without having to shoot at any odd enemy he might encounter. This War Office formula led first to the Vickers F.B.5 "Gunbus," some of which came into service on the Western Front in February, 1915, and then the F.E.2b, a direct descendant of Geoffrey de Havilland's original F.E.1 biplane. But by the middle of the year the French and German Air Forces had proved the superiority of the single-seat tractor and had partly eliminated fire-power problems by the drastic method of fitting deflector plates to the airscrew blades, to push offending bullets out of the way.

Then the Germans pulled out of the bag a fighter which was so far in advance of anything else that it very nearly swept the sky clear of Allied machines—Anthony Fokker's little monoplane. Not only was it fitted with proper interruptor gear so that its gun could fire through the airscrew disc; it could also out-manœuvre anything else flying. In the hands of pilots like Immelmann it wreaked such havoc that Noel Pemberton-Billing opened a violent attack in Parliament on the War Office policy of standardizing on "Factory"-built aircraft for the R.F.C., adding that the officials responsible for deciding which aircraft would be used "failed either by ignorance, intrigue or incompetence to provide the best machines that this country could produce" and thereby sent British pilots to their death against the Fokkers.

As a result of the subsequent Government inquiry, the Royal Aircraft Factory was ordered to concentrate on research and development rather than on production, even of prototypes. This did not prevent their building the superb little S.E.5 fighter and R.E.8 reconnaissance biplane, under the design leadership of H. P. Folland. But, since that time, Farnborough has been largely a land of "boffins", with a record unsurpassed by any research organization in the world.

Another, later result of the inquiry was the establishment of a separate Air Ministry in 1917, which led to the formation of the Royal Air Force, comprising the R.F.C. and R.N.A.S., on April 1st, 1918—the world's first independent air force.

Getting back to 1916, the first British fighter able to meet the Fokker on almost equal terms was Geoffrey de Havilland's little D.H.2, built by the Aircraft Manufacturing Co., which he had joined in 1914. But the real solution to the problem was produced jointly by the R.N.A.S. and Sopwiths in May, 1916, when the first Pups and 1½-strutters came into service, followed shortly afterwards by the Sopwith Triplane. All three had interruptor gear, and they established between them a British leadership in fighter aircraft that has seldom been lost since. R.N.A.S. squadrons of Pups, 1½-strutters and Triplanes were rushed to the Western Front to "rescue" the R.F.C., which itself soon began to receive the first two types in quantity.

For a time the Allied Air Forces held the initiative. Then the Germans produced a new generation of fast fighters, each armed with two guns; at the same time they introduced the

policy of grouping their best pilots into *Jagdstaffeln* led by aces like Boelke and Richthofen. The R.F.C. replied with the Sopwith Camel and S.E.5 single-seaters and the Bristol Fighter—three of the greatest warplanes of all time—and then the Sopwith Dolphin and Snipe. Some idea of the scale of the air warfare that followed is given by the fact that the Allies raised a force of no fewer than 1,481 aircraft, under the leadership of Brig. Gen. "Billy" Mitchell of the U.S. Army Air Service, to provide air cover for the ground forces during the battle of the St. Mihiel salient in September, 1918.

Nor was the emphasis solely on fighters, for in December, 1914, Capt. Murray Sueter had asked Handley Page to produce for the R.N.A.S. an aircraft which, with naval forthrightness, he described as "a bloody paralyzer." This sanguinary weapon came into service in 1917 in the form of the O/400 twin-engined, heavy bomber. Carrying a bomb-load of 1,800 lbs, and powered by two Rolls-Royce Eagle engines, it was the world's first really effective night bomber. This use of British-designed power-units was an important milestone in the development of our engine industry, for nearly all the warplanes used by the R.F.C. and R.N.A.S. up to that time had had engines of French design, with the exception of certain "Factory" types which used the Farnborough-developed Raf series of in-line engines.

Handley-Page O/400s, together with D.H.4 and D.H.9 light bombers, were the backbone of Sir Hugh (now Marshal of the Royal Air Force Viscount) Trenchard's Independent Force, which was formed in May, 1918, for an all-out onslaught on German airfields and industry. In its short active life of five months before the Armistice, this force dropped 550 tons of bombs, 390 of them by night—not a high figure by modern standards, but sufficient to reduce to negligible proportions enemy raids on our airfields. Had the war continued, Berlin itself would have felt the weight of the R.A.F.'s attack, for in October, 1918, the Independent Force received its first Handley Page V/1500 four-engined bombers, each planned to drop 7,500 lb of bombs on the German capital.

In parallel with their achievements on the Western Front, the R.F.C., R.N.A.S. and R.A.F. maintained Home Defence, Middle East, and extensive anti-submarine and anti-Zeppelin forces, both ashore and afloat. The genius of John Porte and J. D. Rennie converted Glenn Curtiss's flying boats into highly effective over-water patrol and attack weapons, to supplement the seaplane and aircraft carriers which the Navy pioneered with success in home waters and the Mediterranean. Unfortunately, the story of the evolution of British sea-flying is too lengthy to recount here, but its highlights include the first take-off from a ship under way—in 1912, by that great character Cdr. Samson; the first successful torpedo attack by Flt. Cdr. C. H. K. Edmonds, piloting a Short seaplane from the gallant little carrier, *Ben-my-Chree*, on August 12th, 1915; and the ultimate evolution of the whole technique of deck operation by fighter, reconnaissance and torpedo-bomber aircraft.

Behind the Services was a great industry employing in 1918 a total of nearly 350,000 men and women, and which produced 26,685 aircraft and 29,561 engines in the last ten months of war. Nor was production achieved at the expense of quality, for in every rôle British military aircraft were second to none—a fact that was underlined by the manufacture of such types as the 1½-strutter and D.H.9 in France and the United States.

In 4½ years the unarmed scout had given way to the fast fighter, armed usually with two machine-guns. Experimentally up to eight machine-guns were fitted and bombs and le Prieur rockets were also added to fighter armament. The heavy bomber had become a powerful offensive weapon in the hands of the Independent Air Force; photographic-reconnaissance had advanced from the trial exposure of five plates in September, 1914, to the production of thousands of prints a day in 1918. In addition, Britain had become the first nation in the world to realize the possibilities of long-range flying boats and carrier-borne aircraft for anti-submarine and other duties.

Then, as soon as the Armistice was signed, all military contracts were cancelled, with crippling results for the aircraft industry. Some firms got out of the aircraft business before going bankrupt; others just went bankrupt. A few, including the great firms of A. V. Roe, Blackburn, Bristol, Fairey, Handley Page, Short, Supermarine and Vickers survived to try to build aircraft for peace instead of war. This was not easy, for although the aeroplane had developed quickly in the war years, progress was directed solely towards improving military efficiency. Commercial flying was still very much an unknown quantity.

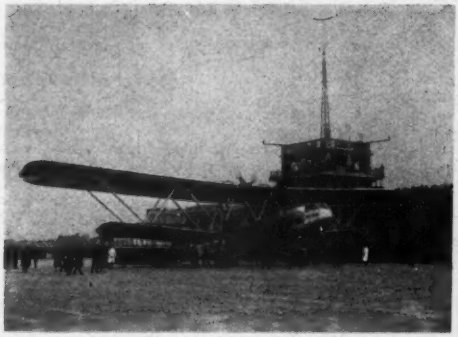
A committee, set up in 1917 to consider the prospects for commercial aviation after the war, achieved little beyond deciding that passenger-carrying would probably be the major source of revenue, with a smaller market for the carriage of freight and perishable foodstuffs. Nevertheless, everyone expected a post-war boom in civil flying, and several companies went to the extent of building prototype transports and light aircraft. Unfortunately, the boom failed to materialize and, to make matters worse, when the ban on private flying was lifted on May 1st, 1919, the pioneer British airline companies decided to follow the lead of the R.A.F. Communications Flight which had used converted bombers to fly V.I.P.s to the Paris Peace Conference. Thus, when Aircraft Transport and Travel, Ltd., and Handley Page Transport, Ltd., flew the first British passenger services to the Continent on July 13th, 1919, they used a converted D.H.9 and H.P. O/400 respectively.

They were followed by Instone Airlines, Daimler Hire, Ltd., the British Marine Air Navigation Co., and a collection of small joy-ride concerns; but lack of Government support at a time when their foreign competitors were being heavily subsidized forced them to cut back their services one by one.

Despite such setbacks, the development of civil flying in Britain never stopped, for the post-war years were highlighted by a series of outstanding pioneer flights which paved the way for the later extension of British civil air routes to every part of the Empire. Greatest of these flights was the first non-stop crossing of the North Atlantic by Capt. John Alcock and Lt. A. Whitten Brown in a Vickers Vimy bomber in June, 1919, which gained them knighthoods and a *Daily Mail* prize of £10,000. Five months later, the world's longest air route was pioneered by Capts. Ross and Keith

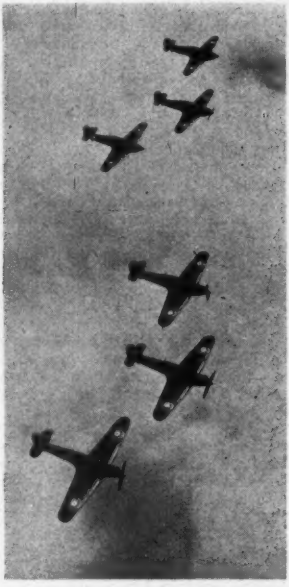
Amy Johnson (later Mrs. Mollison), heroine of many historic flights during the 1930s.

Supermarine S.6B racing seaplane (Rolls-Royce "R" engine), of the type which won the Schneider Trophy outright for Britain in 1931 and later achieved the record speed of 407.5 m.p.h.

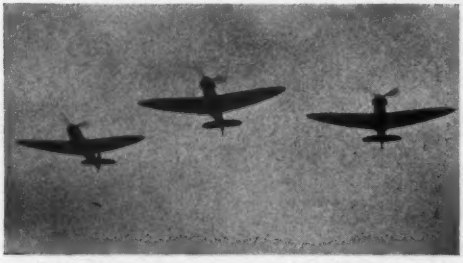


(Above) "Helena"—one of the grand old Handley Page airliners of the 1930s—on the tarmac at Croydon. The four engines were Bristol Jupiters. (Right) Two great British developments—the commercial flying-boat and flight refuelling—are represented in one picture, showing Imperial Airways' "Cabot" being tanked-up by a converted Handley Page Harrow.

FIFTY YEARS OF FLYING . . .



The Hawker Hurricane (above) and the Vickers-Supermarine Spitfire (below) were the mainstays of our defence in the bitterly fought Battle of Britain. Literally scores of variants of both types were developed for various forms of fighting, attack and reconnaissance.



Smith, who linked Britain with Australia for the first time, also in a Vimy.

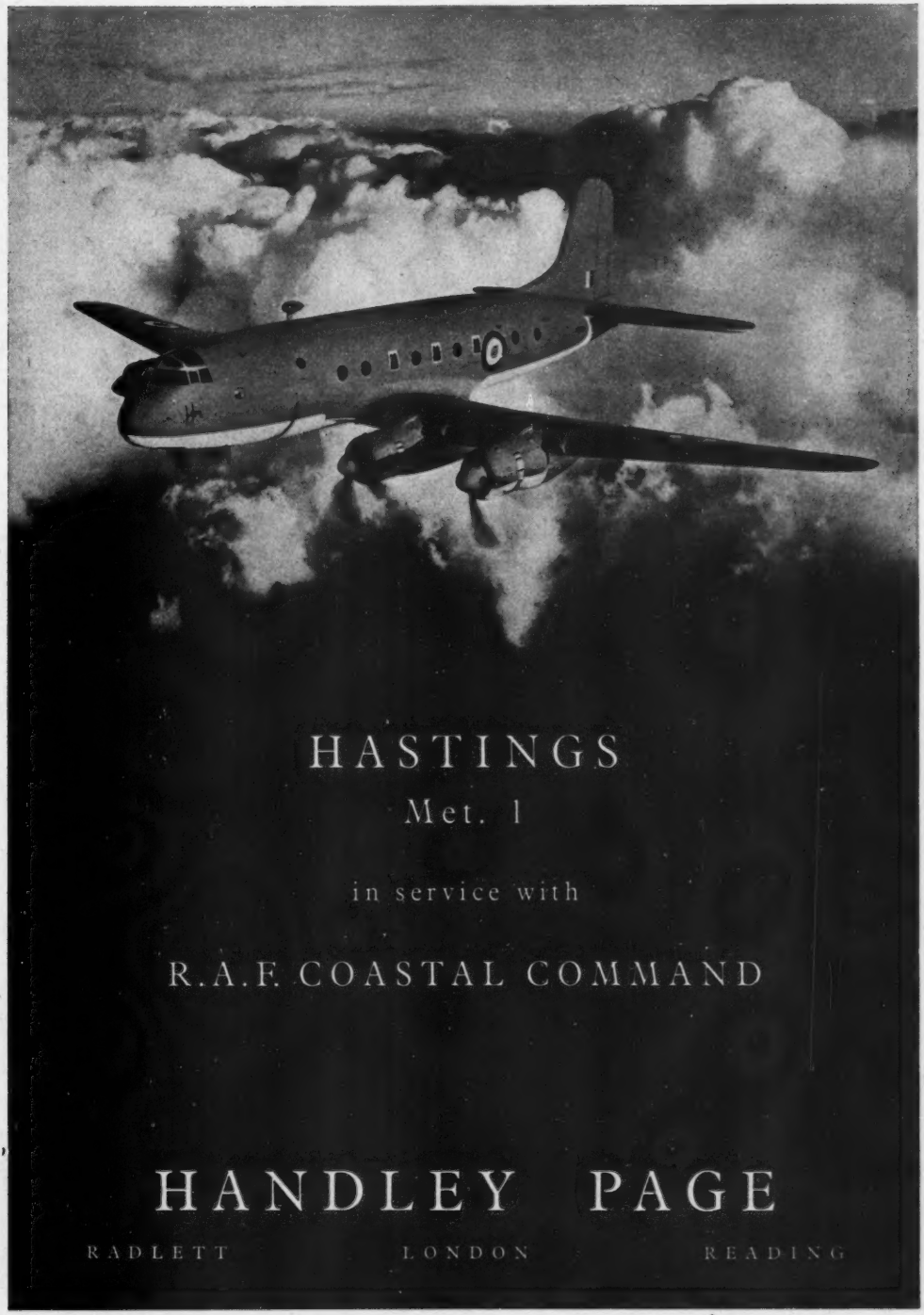
These pioneer flights were not intended as survey flights for possible future airline use, but two years later a pilot named Alan Cobham, from the newly-formed de Havilland Company, began a remarkable series of long-distance flights, some of which were planned from the start as air route surveys. He began with a 5,000-mile flight round Europe, after which he started a Spanish airline to Morocco. Then, in 1922, he flew 8,000 miles round Europe and North Africa, and from Belgrade to London in one day. Next year he extended his flying to Egypt and Palestine, and in 1924 carried the late Sir Sefton Brancker to Rangoon and back.

Best-known of all Cobham's flights, however, were from London to Cape Town and back and to Australia and back in a D.H.50 in 1926, and his great 23,000-mile survey flight round Africa in the prototype Singapore flying boat in 1927, which laid the ground-work for our Empire Air Routes and gained for him a well-merited knighthood. Following in his footsteps came Sir Charles Kingsford-Smith, who in 1928 completed the global network of British pioneering by making the first flight across the Pacific, from California to Brisbane, in the trimotor Fokker *Southern Cross*, and then linked Australia and New Zealand by air for the first time, across the 1,400 miles of the stormy Tasman Sea.

By the time these flights has taken place, Britain had an airline capable of commercializing at least some of the routes, for on April 1st, 1924, the Government had come to the aid of our airlines by combining Handley Page Transport, Instone, Daimler Hire and the British Marine Air Navigation Co. into a single "chosen instrument" named Imperial Airways. Its fleet comprised one ten-passenger Vimy and four eight-passenger D.H.34s previously owned by Instone; three 14-passenger H.P. W.8b biplanes from Handley Page; three more D.H. 34s from Daimler, and B.M.A.N.'s three six-passenger Sea Eagle amphibians. Imperials were based at Croydon Airport, which had been opened as the air terminal for London on March 25th, 1920.

Under the inspired leadership of George Woods Humphery they quickly got down to business. Within two months they had started regular services to Paris, Guernsey, Brussels, Ostend and Cologne, followed by others to Basle and Zurich. Simultaneously, they began to plan replacements for the heterogeneous collection of equipment they had inherited from the earlier companies. The first result was the introduction into service, in 1926, of new Handley Page W.9 and W.10 aircraft and a fleet of three-engined, 18/20-seat Armstrong Whitworth Argosies which were put to work on the London-Paris route. Then, at the end of the year, the first D.H. Hercules air liners went into service between Egypt and Iraq, forging the first link in the chain of Empire air routes.

By March, 1929, Imperials were able to start a through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service from London to Karachi, operating the Mediterranean section with Calcutta flying boats. Later in the year the service was extended to Delhi and in 1932 London and Cape Town were linked commercially for the first time. The first experimental air mail service from the U.K. to Australia was flown in April, 1931, the first passenger services following four years later.

Meanwhile the Argosies and Calcuttas had given way to the superb four-engined Handley Page H.P. 42 and 45 and Short Scipio airliners, which set completely new standards of passenger comfort, including facilities for providing full-course meals during flight. The 16-passenger Scipio flying-boats replaced Imperial's Calcuttas in the Mediterranean in April, 1931; two months later the first of the new Handley Pages went into service on the London-Paris route. Two classes of the latter, eight aircraft in all, were built: the 24-seat *Hannibals* for service between Egypt, India and Central Africa, and the 38-seat *Heracles* class for European routes. With the exception of *Hengist*, burnt accidentally on the ground in 1936, they remained in use for ten years, during which each flew well over a million miles without ever hurting a passenger, until the last one disappeared during a war-time flight over the Arabian Sea. Towards the end of their lives, they were often accused of having "built-in headwinds" by critics who compared their leisurely 100 m.p.h. cruising speed with that of newer types used by Continental airlines; yet their comfort and safety record were such that they continued to carry a lion's share of all the passengers who flew into and out of Croydon.

But by the early nineteen-thirties the monoplane was beginning to re-assert its superiority, and Imperial Airways took delivery of their first monoplane airliners—four-engined A.W. Atalantas—in 1933. Then came one of the most momentous decisions in aviation history, when Imperials decided to buy a new fleet of 28 Short monoplane flying-boats, to be used exclusively on all their Empire services. Foreign operators gleefully anticipated the end of British opposition. Instead, the Empire boats, based on Southampton, gained for British airlines a prestige such as they had never known before. Their achievements in peace and war included operation of the Empire Air Mail scheme, by which letters could be sent by air to any part of the Commonwealth for 1½d. per ½ oz; the first experimental and, later, regular passenger and mail services across the North Atlantic; the first services to Canada and New Zealand, which completed the Empire air network; the first commercial flight-refuelled services; and maintenance of our life-lines to the Empire throughout the war, often in war-zones where no bases existed for landplanes.

Side by side with this inter-war development of big-scale commercial aviation there was a corresponding growth of charter and private flying. Sopwiths had tried to start a light-aircraft movement in 1919 by producing the Dove, a civil version of their little Pup fighter, generally regarded as the most delightful aircraft to fly that has ever been built. But they were seven years too early. Both the Air Ministry and the *Daily Mail* organized light-aircraft contests in the early twenties, with the same object in view, but it was not until de Havillands produced the prototype Moth in 1925 that any real interest in private flying was kindled.

There had never been any lack of interest in aviation as a spectacle. On the contrary, it was considered a poor show if fewer than 20,000 people turned up at a week-end flying meeting at Hendon in 1913-14, and events such as the Aerial Derby, King's Cup Races, Schneider Trophy Contests and R.A.F. Displays at Hendon always attracted a large public following. But flying was, in general, considered an expensive, rather dangerous game for supermen. The Moth changed all that

Here was an aircraft that could be bought for £595, flown by almost anybody, towed behind a car and kept in a garage. It made possible the flying-club movement, which spread like magic throughout Britain and the world. Soon the Moth even had its own specially designed engine—the lightweight Gipsy—and demand became so great that factories to assemble and build Moths were set up in Australia, Canada, India, South Africa, Rhodesia and New Zealand, marking the first real expansion of the British aircraft industry into the Empire.

The Moth quickly became the most famous aircraft in the world, creating at the same time a new generation of sporting pilots, some of whom achieved incredible feats of long-distance flying on less than 100 h.p. Two intrepid airmen—Neville Stack and B. S. Leete—who flew Moths from Britain to India in 1926 were generally regarded as candidates for the nearest padded cell. But next year R. R. Bentley flew one solo to Cape Town and back, while Lady Bailey first set up a height record of 17,289 ft in a Moth, with Mrs. de Havilland as passenger, and then flew it 18,000 miles solo round Africa. Moths won the King's Cup in 1926, 1927 and 1928; and in the following year the Zenith Cup, the 4,000-mile race round Europe, and the South African and New Zealand Aerial Derbies.

In 1930, Amy Johnson gained the acclamation of the world with a solo flight to Australia in 19½ days. In April, 1931, C. W. A. Scott covered the same route in 9 days, 4 hours; and three months later Jim Mollison flew the reverse direction in only 8 days 22 hours. Then came the Puss Moth monoplane, which could carry three people at 105 m.p.h. at 20 miles to the gallon, a fuel consumption which, with extra tankage, made possible lightplane flights across even the Atlantic. Bert Hinkler was first, with a flight from New York to London via the South Atlantic. Mollison conquered the North Atlantic solo from east to west, 2,600 miles in

The first take-off, at Cranwell, of the Gloster-Whittle E.28/39, Britain's first jet aircraft. Pilot, F/L. P. E. G. Sayer; date, May 15th, 1941.

An Avro Lancaster (four Rolls-Royce Merlin engines) unloads a clutch of 1,000 lb bombs on a flying-bomb launching site in Northern France.

In tribute to the naval airmen who have served their country with honour since 1911, we reproduce this superb study of the aircraft carrier H.M.S. "Victorious" in heavy weather. The aircraft are Fairey Albacore torpedo spotter reconnaissance biplanes and a Fulmar eight-gun fighter monoplane.

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30½ hours, and Amy Johnson flew her Puss Moth to Tokyo and back. In doing so, they paved the way for Jean Batten, Beryl Markham, Alex Henshaw and all the other pilots, in other types of aircraft, who helped to prove that the light aircraft was no local-airfield toy.

Year after year, these pilots and scores of other enthusiasts matched their skill in the King's Cup Race. Then, in 1934, came the great MacRobertson Race to Australia, with prizes totalling £15,000. Entries ranged from Melrose's little Puss Moth to K.L.M.'s DC-2 transport flown by Parmentier and Moll; but the dark horses were three specially-built de Havilland Comet two-seat racing monoplanes, of incredibly clean lines and each powered by two 200 h.p. Gipsy Six engines. They were flown by Amy and Jim Mollison, C. W. A. Scott and Tom Campbell Black, and Ken Waller and O. Cathcart-Jones, and from the start of the race at Mildenhall they left little doubt of their qualities. Scott and Black reached Sydney only 71 hours after take-off in Britain; Waller and Cathcart-Jones completed the round trip in 13¼ days.

Meanwhile, Edward Hillman, who had been operating since 1932 a local airline between Romford and Clacton with Puss Moths and Fox Moths, suggested to de Havillands that it might be an idea to produce a sort of twin-engined Moth, combining the latter's sturdiness and ease of maintenance with accommodation for six to ten passengers. The result was the Dragon, from which developed the Dragon Rapide, the airliner which made possible economical short-range passenger services.

By 1935, Hillman's Airways were operating Dragons and Rapides from Essex Airport at Abridge to Paris, Brussels, Ostend, Belfast, Glasgow, Liverpool, Manchester, Hull and Thanet. Several other airlines, mostly operating Dragons, Rapides and three-engined Spartan Cruisers, had entered the market by then; and in 1935 three of them, British Continental Airways, United Airways and Spartan Air Lines, combined with Hillmans to form British Airways, which operated highly successful services throughout Britain and Europe until amalgamated with Imperials to form the State-controlled British Overseas Airways Corporation in April, 1940.

Military flying, too, progressed steadily in the years between the two World Wars. The Royal Air Force had been cut to the bone after the Armistice in 1918, but the skeleton was a pretty lively one, as visitors to the annual R.A.F. Display soon discovered.

What the Service lacked in numbers, it more than made up in quality, which it maintained by rigorous training, continuous active service in India, Iraq and anywhere else that trouble threatened, and by a series of outstanding development flights. One of the earliest of the latter was the first two-way crossing of the North Atlantic by the Airship R.34 in July, 1919. It was one of the last great exploits of British airships, for there was little development until 1930, when the R.100 and R.101 were completed; and construction was finally abandoned when the R.101 crashed with the loss of 47 of her personnel.

Most of the other great flights were made by flying-boats, including a 28,000-mile journey by four Southamptons from Britain to Singapore, Australia, Hong Kong and back to Singapore in 1927-8. But there was also a fine 14,000-mile flight by four Fairey IIIDs from Cairo to the Cape and back to England in 1926, followed by long-distance records set up in R.A.F. Hawker Horsley and Fairey Long Range aircraft and, of course, the magnificent victories of the R.A.F. High Speed Flight in a succession of Supermarine racing seaplanes, which won the Schneider Trophy outright for Britain.

Fortunately, the aircraft industry did not halt the process

of continually turning out newer and better military prototypes, even when their assembly shops were forced to mass-produce milk churns and motor-car mudguards to (if the mixed metaphor may be forgiven) keep the wolf from the door.

Things improved slightly in the middle twenties. Stocks of war-time aircraft had been largely used up by then, and the Air Force had to be re-equipped. In addition, British prestige had reached such a peak following our achievements in both civil and military flying that orders for fighters and light bombers began to flow in from overseas.

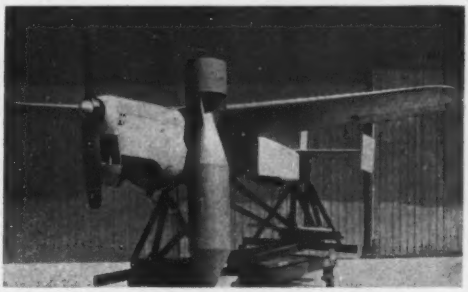
Through the availability of engines like the Napier Lion, Bristol Jupiter and Rolls-Royce Kestrel, our fighters remained second to none, and in five years the R.A.F. progressed from the 230 h.p., 121 m.p.h. wood-and-canvas Snipe, through the aggressive little Grebe and Gamecock to the 450 h.p. 174 m.p.h. all-metal Bulldog and Fury. Armament remained at two machine-guns, but in 1931 Glosters produced their S.S.19 prototype with six guns, and this led to the famous Gauntlet and Gladiator.

But the biplane's days were numbered, for up at the Air Ministry an enterprising officer named Ralph Sorley (now Air Marshal Sir Ralph Sorley, R.A.F. ret.) had drawn up a specification for a monoplane fighter with no fewer than eight guns, and under the genius of Sydney Camm and R. J. Mitchell this "spec." produced the Hurricane and Spitfire, powered by the now famous Rolls-Royce Merlin engine. Bombers, too, became monoplanes, as the old bird-cage Virginias gave way first to the Heyford biplane then to the Hendon, Hampden and Wellington monoplanes.

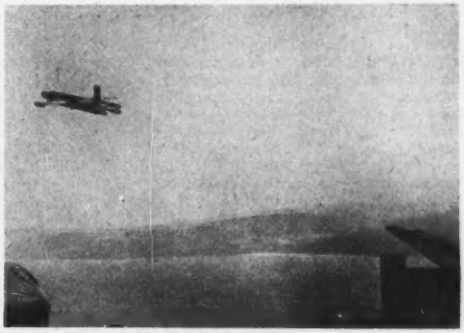
With a few notable exceptions, biplanes took their final curtain-call at H.M. King George V's Jubilee Review at Mildenhall in 1935—the year that Hitler unveiled his new Luftwaffe. From that time war with Germany seemed almost inevitable and a great expansion programme was started to prepare the Royal Air Force for battle. Huge shadow-factories were built and several of them handed over to motor manufacturers, to supplement the hundreds of Wellingtons, Hampdens, Battles, Blenheims, Hurricanes, Spitfires, Swordfish torpedo-bombers and other types that were to be produced by the aircraft industry itself. Shortly afterwards the Civil Air Guard scheme was inaugurated, under which some 12,000 ordinary men and women either qualified for their "A" Licence or were under instruction, with Government subsidy, by September, 1939, to provide a wartime reserve of pilots.

Simultaneously, design work began on a series of giant four-engined bombers that were eventually to become famous as the Stirling, Halifax, Manchester and Lancaster; while a young R.A.F. officer named Frank Whittle went on quietly building a new type of engine that was destined to revolutionize every branch of civil and military flying.

Even this activity did not seem enough to T. O. M. Sopwith and his fellow Hawker directors, so, at a time when the Government had ordered a mere hundred or so Hurricanes, they decided on their own initiative to erect a new factory at Langley and to start work there on 1,000 "Hurris." The rest of the story is well known. Those 1,000 Hurricanes, backed up by Spitfires, were sufficient to win a great victory in the Battle of Britain in 1940, giving the Empire and its subsequent Allies time to build up land, sea and air forces



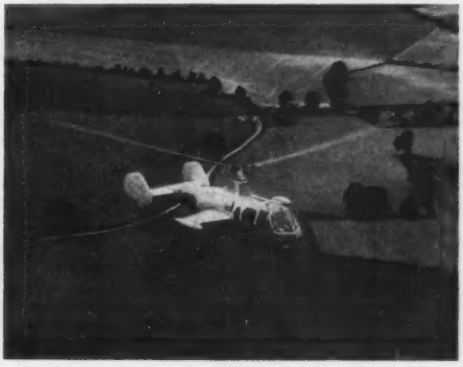
The Hoopla, an experimental pilotless winged bomb, with a Gipsy Major engine, under development during the war by Miles Aircraft, Ltd.

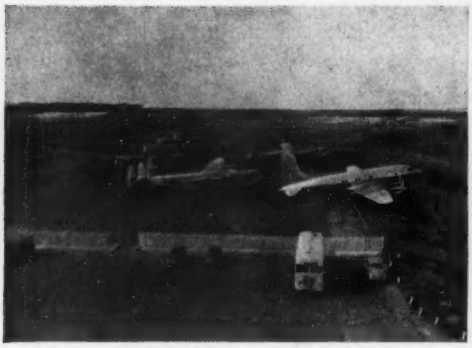


The launch of a Fairey Stooge rocket-propelled ship-to-air guided missile —the first British development of this kind to be announced since the war.

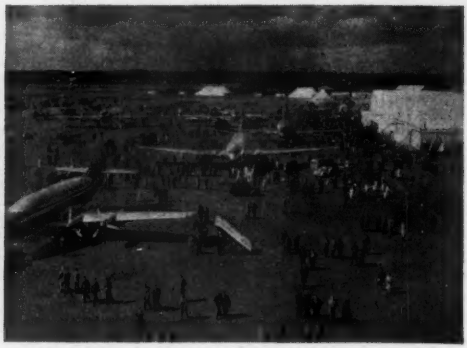
The special de Havilland Vampire, with D.H. Ghost turbojet, which, on March 23rd, 1948, secured the world's altitude record of 59,446 ft.

Fairey Gyrodyne 4/5-seater helicopter (Alvis Leonides engine) which, on June 28th, 1948, established a helicopter speed record of 124.3 m.p.h.





A scene at Gatow in 1948 during the Berlin Airlift, with a civil-operated Avro Tudor working alongside Yorks of R.A.F. Transport Command.



The 1949 S.B.A.C. Display at Farnborough, with the Apollo, Comet, Viscount, Attacker, Hermes IV and V, Wyvern and Meteor 8 in evidence.

FIFTY YEARS OF FLYING . . .

sufficient to accomplish the final destruction of the enemy.

In World War II, the aircraft industry became the biggest in the country, employing a peak of 1,800,000 people, and turning out a total of 124,109 aircraft and well over a quarter of a million engines. The R.A.F. used these aircraft to fly 700,226 fighter sorties, drop 988,307 tons of bombs, carry out 218,024 Coastal Command missions and 469,726 hours of operational transport flying. Its achievements cost a total of 27,478 aircraft and 72,794 aircrew.

The Navy, once again running its own air arm, used its torpedo-bombers and fighters to keep open the sea supply routes without which the war could never have been won, by a skilful, aggressive policy of attacking enemy surface and underwater vessels in every ocean and in the home bases from Narvik and Taranto to Tōkyō Bay.

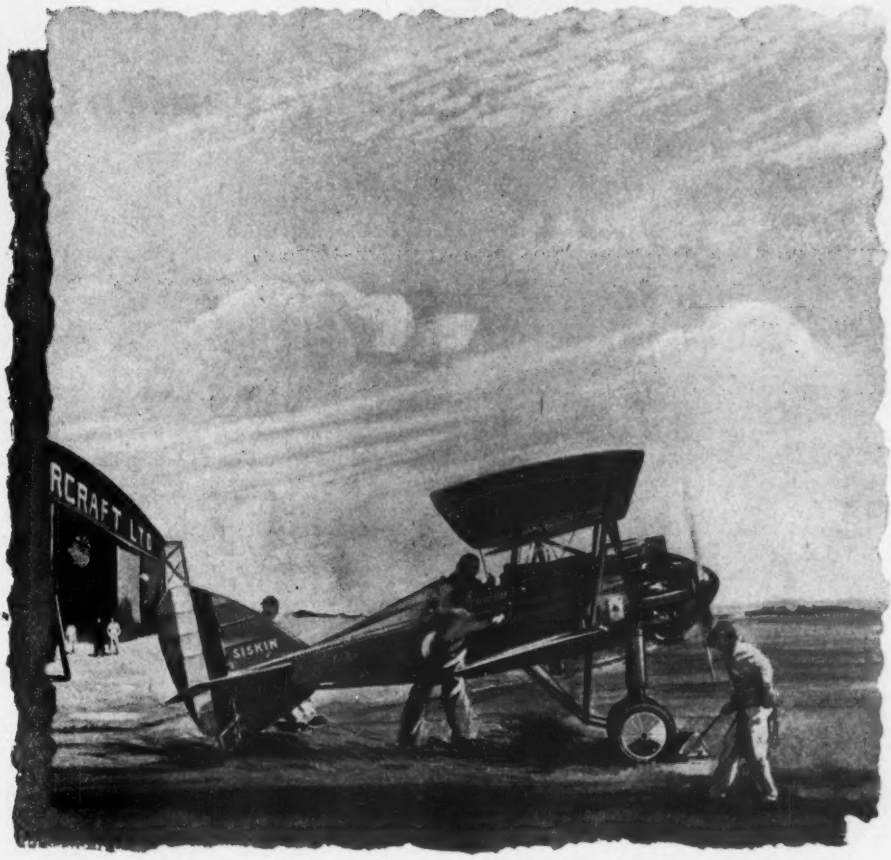
Once more war had brought great advances in military flying. Fighter speeds had increased from 335 m.p.h. to nearly 500 m.p.h., and armament from eight 0.303 guns to four 20 mm. cannon, plus rockets and bombs. Bomber loads had gone up from 1,000 lb to 22,000 lb. Jet-propulsion —heralded by the first flight of the little Gloster-Whittle E 28/29 in May, 1941—and the atomic-bomb had helped to make air power the key to survival on land or sea.

And once again British civil flying paid a high price, for under a war-time agreement transport aircraft for all the Allied forces were built in the United States. As a result, Britain had no aircraft suitable for re-equipping her inter-continental airlines after the war and was forced to buy American.

True to character, Britain then took a gamble—or, rather, two gambles. First of all, realizing that our industry could never overtake America's lead in piston-engined transports, it was decided to take a couple of jumps ahead and put all our money on developing a series of jet airliners that would make their piston-engined counterparts as obsolete as the dodo. Secondly, Britain gambled on peace, despite such ominous warnings as the events that led to Berlin Airlift, and decided to make do with existing military aircraft such as the Meteor, Vampire, Lincoln, Sea Fury, Firefly and Sunderland, until a new generation of super-bombers and fighters could be produced, powered by the finest jet engines in the world.

At the moment, with the Comet and Viscount nearly ready for service, it looks as if the first gamble has paid. Unfortunately, of the military types only the superb Canberra is entering squadron service, with the Valiant, Swift, 1081-development, Seahawk and Gannet merely "in production." Only time will show if this second and greater gamble was justified.

The epitome of Britain's will to lead the world in commercial flying—the de Havilland Comet, with four D.H. Ghost turbojets. Comets will be carrying fare-paying passengers for British Overseas Airways later this year. Rolls-Royce Avons will be installed in a second version.



Congratulations to the Royal Aero Club from another pioneer

Thirty years have passed since the first valiant 'Siskin' took the air. What great advances in civil and military flying—what an outstanding contribution to aeronautical research this famous firm has made in three decades. From 'Siskin' to 'Night Fighter'—'Argosy' to 'Apollo'—'Wing' to 'Missile'—Tail-less Aircraft to Pilotless Aircraft—A.W.A. has led consistently in this age of great development.

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1947 Approved by the Ministry of Transport and I.M.R.A.M.N.

1948 The Lane Identification service introduced. Danish Chain of stations completed.

1949 Approved by the Ministry of Civil Aviation.

1950 First air trials of the Flight Log: Pictorial Presentation of Position an accomplished fact.

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I.A.T.A. and I.C.A.O. recognize the System.

Germany and France building Chains for completion October 1951 and winter 1952.

* * *

We are proud of this record although we realize with humility that 45 years must pass before we celebrate our own Golden Jubilee. We may claim, however, that the Decca Navigator is already well established in the British Aircraft Industry's tradition of technical leadership: it is the most advanced radio aid to navigation in the world, first in the field with accurate position-fixing at all heights and first to translate the technique of Pictorial Presentation of Position from a drawing-board dream into a practical aircraft instrument.

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CIVIL AVIATION

FIRST OFF a new production line at the Glenn L. Martin Company's Baltimore factory is this 40-seat 4-0-4 destined for T.W.A. Three operators have ordered a total of 103 of these machines. Maximum cruising speed is 280 m.p.h. and gross weight is 42,750 lb.

MILL HILL DAKOTA—COURT FINDINGS

THE report of the Court Investigation on the accident to B.E.A.'s Dakota G-AGIW, which occurred on October 17th, 1950, was published by the M.C.A. last week.* It will be recalled that the aircraft crashed into trees at Mill Hill while attempting to return to Northolt following a failure of the starboard engine a few minutes after take-off. Twenty-eight of the 29 occupants lost their lives.

The primary cause of the accident is considered by the Court to have been the failure of the master-rod bearings in the starboard engine—an occurrance of which the report states, "this failure could not have been foreseen or guarded against by any greater exercise of vigilance than could reasonably have been required of B.E.A."

The secondary probable causes are listed as being the failure of the pilots to: (a) make an immediate visual landing on realizing that the starboard engine had failed; (b) make use of S.B.A.; (c) retract the undercarriage while flying away from the airport over a distance necessary to bring their aircraft under the effective control of G.C.A., which the pilots had already elected to use as their let-down aid. It was also thought possible that the glazed lead deposition on the sparking plugs in the port engine was indicative of possible ignition trouble which may have caused a loss of power sufficient to prevent the aircraft from maintaining level flight. It was stressed that the loss of G-AGIW could not be ascribed to any one cause, and that an explanation of the accident must be sought in a number of coincident factors, none of which would in itself have been sufficient to bring about the crash.

There was also a finding to the effect that the First Officer (whose licence, incidentally, had lapsed five days previously) had a training record which made it inadvisable that he should have been permitted to handle the aircraft if I.F.R. conditions were likely to be met almost immediately after take-off.

Some of the comments and general recommendations made by the Board have been accorded rather spectacular publicity in the national Press, and this has tended to give the unfortunate impression that, in some aspects, B.E.A.'s operating methods leave something to be desired. As in many reports of this nature, the implications are probably more serious than the actual wording suggests, but, on the factual side, there are certainly points which, in fairness to B.E.A., seem to deserve an airing.

The first of these concerns the question of cockpit discipline, of which the Court says it has been left with "a sense of disquiet" about the existing arrangements for determining the relative responsibilities of the Captain and First Officer of a Dakota in an emergency. The Court appears to have some misgivings about B.E.A.'s former system, under which responsibility "followed the seat" and not the status of the pilot. (Out of deference to the Court's recommendation on the subject, the Corporation has since ruled that, in future, Captains will occupy the left-hand seat throughout the entire flight.) In practice, of course, the Dakota is equally controllable from either seat and it is hardly likely that in this case the Captain was not able to take complete control of the situation. The fact that the First Officer's licence had lapsed was due to a clerical omission in B.E.A.'s checking system, but certainly was not a contributary cause of the accident. Although the training record of the First Officer in question was held to be unsatisfactory, it should be pointed out that he was in possession of an Instrument Rating, and the check which he had failed was purely a periodic check imposed privately by the Corporation.

An examination of the wreckage made it almost certain that the undercarriage was locked down at the moment of impact. The Court believes that the first intention was to make an immediate visual landing on Runway 26, for which, in fact, the undercarriage was lowered. Either because the pilots lost sight of the airport, or because they preferred to rely on G.C.A., a full left-hand circuit was never made and the aircraft continued to fly downwind, passing uncomfortably close to high ground.

It is thought possible that, faced with this hazard, both pilots forgot the position of the undercarriage and made no attempt to retract it a second time.

It has been found that under test conditions at 28,000 lb a.u.w., the Dakota will, in the one-engine-out condition, maintain height at rated power with undercarriage down and gills "trailed." Some doubt exists as to whether the port engine was actually developing full power at the time of the accident and, in this connection, it has been suggested that the condition of some of the sparking plugs in the port engine might have caused a loss of power. It was also recommended that a more satisfactory method of plug-cleaning might be adopted than the sand-blasting technique now employed. It should be pointed out that this method has been fully approved by the A.R.B. for this type of plug (Lodge RS/19/2R) and that the plug-life experienced with them hitherto has been entirely satisfactory.

"Failure of the pilots to use S.B.A." is another point on which many pilots will certainly disagree. Under the duress of an emergency landing, and knowing that, at its maximum a.u.w., the Dakota requires more than the normal quota of concentration to maintain height, it is hardly likely, nor even advisable, that in close proximity to an airport providing G.C.A. facilities, a pilot should attempt to start searching for the beam and carrying out the procedure entailed in an S.B.A. The decision to resort to G.C.A., as Capt. Carson did in this case, is taken to indicate that he was intending to act in accordance with B.E.A. Standing Orders to climb to 1,500ft before selecting his method of landing.

In conclusion, the report draws attention once again to the question of rearward-facing seats in passenger aircraft. It recommends strongly that seats of this type should be stressed "to withstand the deceleration which can be reasonably expected in an air crash without attempting to arrive at a computation of the figure of stress which might have been necessary to save lives in the present case." The Court records its impression that the figure of 9 g., mentioned by an A.R.B. witness, is too low.

As Mr. Roland Adams, K.C., president of the Court of Investigation, points out in his introductory letter to the Minister of Civil Aviation, the fact that the Court failed to determine the predominant cause of the accident does not preclude its findings from serving as a basis for useful discussion to the general end of securing greater flying safety. We feel that some of the observations and recommendations which were of a general nature have, in some quarters, tended to cause undue emphasis to be placed upon comparatively irrelevant matters. This, in turn, has reflected unfavourably and to some extent unjustly on B.E.A.

*M.C.A.P.93., *obtainable from His Majesty's Stationery Office, price* 1*s.* 3*d.*

THE CORPORATIONS' TRAFFIC IN 1950

THE provisional traffic figures—announced last week by the M.C.A.—for the operations of B.O.A.C. and B.E.A. during the financial year ended March 31st, 1951, show that together the Corporations handled about one-third more traffic than in the previous year.

Passenger-mileage flown totalled 835 million—an increase of 32 per cent, while freight ton-miles rose by 30 per cent to 24 million; mail ton-miles, at 13 million, represented an increase of 18 per cent. The overall revenue load-factor rose from 57 per cent to 59 per cent, but the passenger load-factor showed a decrease of 5 to a new figure of 57 per cent.

A break-down of these totals between the two operators shows that B.O.A.C. enjoyed a more substantial improvement than did B.E.A. The total of revenue load ton-miles total flown by B.O.A.C. rose by 31 per cent to 84 million, while B.E.A.'s traffic increased by 25 per cent to 28 million load ton-miles. The respective passenger load-factors for B.O.A.C. and B.E.A. were 56 and 58 per cent; the totals of passengers carried were 196,000 and 940,000 respectively.

CIVIL AVIATION . . .

BREVITIES

UNDER an amendment to the existing bilateral agreement between Eire and Canada, the right of T.C.A. to pick up and set down at Shannon, traffic to and from Canada, has been extended to cover traffic to and from other countries. Eire's operating rights at Gander have also been re-confirmed.

* * *

The simplified procedure for outward clearance of unaccompanied luggage by air to destinations abroad (hitherto confined to Northolt) is now being made available at all U.K. Customs airports.

* * *

The U.S. Wage Stabilization Board has set up two separate committees to investigate the pay claims of personnel of the aircraft manufacturing and air transport industries.

* * *

De Havillands have intimated that the D.H. Comet on loan to B.O.A.C. will probably make its proving flight from London to Australia much earlier than expected: the machine may visit Singapore in about a fortnight's time. Its longest development flight to date—from London to Johannesburg and back—was due to take place this week.

* * *

It is understood that B.O.A.C. are to introduce a new service between Prestwick and New York on August 1st, thus providing a capacity increase of 250 seats weekly from Prestwick. Certain other proposals are also under consideration which may lead to cheaper services by the end of 1952.

* * *

Pan American Airways are to install dictation equipment—in the form of Gray Audographs—in aircraft flying their New York to Paris route. This will enable businessmen to dictate letters in flight and post the unbreakable discs back to their own offices for transcription. The Audograph can also be used to interview passengers while airborne.

The president of National Airlines has disclosed that his company would buy at least ten Avro Jetliners if this type were to go into production. The company is also contemplating the purchase of a number of Martin 2-0-2s.

* * *

A good example of the speedy service afforded by B.E.A.'s freight department was seen recently when a request was made for a Rolls-Royce Merlin engine to be flown urgently to Rome, where a Tudor was grounded. The time interval between receiving the call and the Merlin's delivery in the Italian capital was just over twelve hours.

* * *

The first of three Douglas DC-6B airliners ordered by Swissair arrived in Zurich on July 4th. These aircraft will go into service on the New York—Zurich route, on which, at the moment, DC-4s are in service. The DC-6B is, of course, the larger and faster version of the DC-6.

* * *

The Government of Cuba has now approved a bilateral agreement with Spain which was negotiated in Madrid last year. The pact establishes legal requirements for airlines operating between the two countries and also provides for the release of Cuban airline assets which were previously "frozen" in Madrid.

* * *

During May, B.E.A. carried a total of 11,084 passengers, and several of their routes are booked to capacity for July and August. Depending on the availability of additional aircraft, extra services will be run to Belfast and London. Traffic on B.E.A.'s Glasgow-London and Edinburgh-London routes is reported to be increasing, and it is hoped that both these routes will show a profit over the next three months. Traffic on the Irish routes has also improved.

CLUB AND GLIDING NEWS

SMALLER in scale than the Deauville Rally, but no less enjoyable, the La Baule air week-end which took place on July 7th-8th attracted some 35 British aircraft and nearly 100 members or associate members of the Royal Aero Club (for whom it and the Deauville Rally are arranged each year through the generosity of M. and Mme. André).

Because an hour or two more flying time is required to reach La Baule, near St. Nazaire, and to return home again, the organized part of the week-end programme is shorter than for most other such rallies. We believe, however, that the beautiful, sweeping bay with its warm water and golden sand appeals to British visitors even more than do the attractions of many other French resorts.

Prizes were given this year for arrival time and distance flown on a formula basis, and for written first impressions on arrival at Escoublac airfield. Mr. W. H. Byars, of Perth, Scotland, won the former, while the impression favoured by the organizers was that recorded by Mr. E. W. Lucas, who said, "They say 'See Naples and die'; why not see La Baule and live?" Three other prizes were given under this heading.

At the official dinner in La Baule's attractive casino, several speeches of welcome and thanks were made. Mme. André was present at the dinner, and the chief guests included A.V-M. George, British Air Attaché; Dr. Dubois, Senator-Mayor of La Baule; the Prefect of Provence; and Major Jacques Allez, president of the Aéro Club de France.

Mr. Joe C. C. Taylor—who, with the guest of honour, A.V-M. George, had acted at midday as one of the judges in a beauty competition—spoke for the British guests. Thanks in French and English were added by Mr. Claude Grahame-White, whose recollections of the earliest days of flying—particularly the first Channel crossing by air, and the London-Manchester flight—were much appreciated.

THE Luton Flying Club is extending an open invitation to members of all A.B.A.C. clubs to participate in an informal "At Home" to be held next Sunday, July 22nd, at Luton Airport. Three arrival competitions will be held, one for visitors coming by air, for which a silver tankard is offered, and two further competitions for pedestrians and visitors in cars. The sealed winning times will be, in the case of aerial visitors, between 1200 and 1400 hr; for pedestrians between 1430 and 1530 hr; and for cars between 1400 and 1500 hr. A *Concours d'Elégance* for visiting aircraft is to be judged by the committee at 1530 hr, the prize being another (pewter) tankard.

All members of A.B.A.C.-affiliated clubs will be provided with free tea in the clubhouse from 1630 hr. The "At Home" will end with an informal dance in the clubhouse during the evening, at which a buffet supper will be available at club prices. Intending visitors are asked to advise the manager of the Luton Flying Club (telephone Luton 4426) of the size and means of arrival of their parties.

THERE is news of a new French light aircraft which, although no gross weight is quoted, looks as if it might easily qualify for the ultra-light category. It is the two-seater twin-boom Roussel, powered by a prototype two-stroke water-cooled Roussel engine with three cylinders and six pistons. The machine is expected to make its first flight in September.

Another interesting French experiment, the Emouchet Escopette glider (powered by four pulse-jets) which performed so impressively at Le Bourget, has already made about 170 flights.

The second Emouchet, fitted with two additional pulse-jets, made its first flight at the beginning of June. The additional power available has reduced its take-off distance by 150ft to 750ft in 20 seconds, and its service ceiling of 4,500ft is now reached in 20 minutes. The fuel consumed in climbing to 3,000ft is said to be about 6½ gallons.

A WORD of advice this week to feminine flying enthusiasts: If your instructor is convinced that women are no better at flying than at car-driving, repair at once to the Isle of Wight Aero Club at Sandown, where there is to be found what must surely be a women pilots' Utopia. The airport and the club are both managed by one of our foremost women flyers, Miss Mary Wilkins, a former A.T.A. pilot who, in addition to her club duties, is also a director of, and flies for, Bees Flight, Ltd., a locally based charter company.

Even the C.F.I. at Sandown is actually an "instructress"—Miss Vera Strodl—who is also well known for her work in the A.T.A. Operations are carried out with a fleet of six aircraft, including three Geminis. The airport is also the only one on the island operating a V.H.F. ground station and providing full facilities for night-flying.

A member of our staff who recently visited the club reports that Sandown's extra quota of feminine charm has had no disturbing effect on the enthusiasm of club members; the general atmosphere is said to be one of "above average" keenness. So if any reader feels that a little feminine sympathy might improve her forced landings, or if her present instructor's remarks offend her girlish ears, then Sandown is surely the answer to her troubles; and, anyway, the club has said it would like some more members.

WORK OF THE A.R.B.

The Chairman, Lord Brabazon, Presents the Fourteenth Annual Report

An informal luncheon party was held at Londonderry House, Park Lane, on Thursday, July 12th, for the presentation by Lord Brabazon, the chairman, of the fourteenth annual report of the Air Registration Board. In addition to the vice-chairmen and council of the A.R.B. (the members of which are named at the end of this account), a distinguished guest-list included Lord Ogmore, the new Minister of Civil Aviation; Sir Archibald Rowlands, Permanent Secretary to the Ministry of Supply; Sir Frederick Bowhill, Chief Aeronautical Adviser, M.C.A.; Air Marshal J. N. Boothman, Director-General of Supplies (Air); and Sir Miles Thomas, chairman of B.O.A.C.

Proposing the toast of "The Minister of Civil Aviation," Lord Brabazon praised the work of Lord Pakenham, the previous minister, "who had at first been a critic" but with whom the A.R.B. had later enjoyed an excellent relationship. Lord Brabazon also acknowledged the great help and co-operation of the M.C.A., to whom, he said, the A.R.B. were deeply grateful. He also thanked Mr. Guy F. Johnson, who had been honorary chairman since 1937 and whose work was now being taken over by Mr. J. J. Taylor.

Lord Brabazon spoke of his board's willingness to extend its activities so long as the team was kept together, and he told Lord Ogmore that its loyalty and support for the well-being of aviation transcended personal and political opinions.

The new Minister's reply was aptly summed up by "Peterborough" of the *Daily Telegraph*, who said that Lord Ogmore "swam bravely in an ocean of aeronautica which might have drowned a less determined minister." Among the many topics which Lord Ogmore mentioned were his faith in the future of jet propulsion for civil aviation and the opinion that, on the basis of results and experience so far obtained with the Comet, all foreseeable problems were capable of solution.

Major R. H. Thornton proposed "The Guests" in one of his characteristic, highly amusing speeches, and Mr. W. T. Gill, president of the S.B.A.C., said that the A.R.B.'s fourteenth report was a very commendable document. He referred to the board's complete integrity, and looked forward to a further accession of strength internationally to the A.R.B.

In compiling his report (which was not read at the luncheon) Lord Brabazon commented on a few of the problems—both circumstantial and technical—with which the British aircraft industry is confronted today. While, he said, it was a great disappointment to see such aircraft as the Brabazon I and the Princess jeopardized by the present political situation, Britain should never again fall into the trap of allowing armament programmes to halt civil development. He emphasized particularly the need for energetic research in connection with clear-air gust and icing conditions at high altitudes, which were most likely to affect turbine-powered aircraft. A careful watch should also be kept, he thought, on the possibility of fatigue troubles which might develop in high-speed aircraft now that the normal working stresses of the materials were rather higher, in relation to fatigue strength, than those to which we had hitherto been accustomed. The chairman mentioned the growing tendency to link airworthiness more closely with operational uses. Emphasizing that all concerned should continue to strive for great increases in the chances of passenger survival during accidents, he voiced, also, his personal concern that fuels of higher volatility were now being advocated for turbines.

So far as international airworthiness requirements were concerned, Lord Brabazon thought that the time taken to reach an agreement was so long that there was a risk of a detailed code being out of date before it was fully agreed. He believed that more fruitful progress would be made if I.C.A.O. were to confine itself to the more modest target of establishing only the important fundamental requirements, leaving the details to be filled in as the differing viewpoints became stabilized. For its own part, the A.R.B. was satisfied that the British Civil Airworthiness Requirements (the first to embody fully international standards) would provide an example which other nations could follow with confidence.

British performance requirements had already been accorded a status equal to those of I.C.A.O., and the Board, said Lord Brabazon, was confident that the standards eventually agreed would be very similar to the British proposals. (These latter, incidentally, have already been incorporated in the new issue of section D of British C.A.R.s; the new issue of section C contains, among other additions, the requirements for airscrews to be used with turboprops.)

Concerning prototype investigation, the report mentions the fact that only three normal C.s of A. were granted during the year (Hermes IV, D.H. Heron and Slingsby Motor Tutor); this was attributed partly to pre-occupation with military requirements. The investigation of the third Comet (which would be the first to meet the requirements for a full normal C. of A.) was said to be well advanced. A.R.B. observers were currently participating in de-icing trials on seven types of aircraft.

During the last twelve months, fifteen piston engines had been type-tested satisfactorily and granted approved power ratings. Type tests were also given to seven gas turbine units, of which two were turbojets. Although it appeared that few high-powered piston engines would be forthcoming in the near future, there was still no indication that the gas turbine would successfully invade the small-engine field. Fifty airscrews (of which 27 were fixed-pitch and 23 variable-pitch) were approved during the year. In addition, several airscrews incorporating basically new blade-construction principles were under development. A number of new airscrew-control systems associated with automatic feathering were under investigation and would be approved if the present trend of satisfactory development continued.

Progress had also been made in reaching agreement with the S.B.A.C. and the M.o.S. on recommended practices for the testing of prototype helicopter transmission and rotor systems.

Dealing with instruments and equipment, Lord Brabazon said he was pleased to report that the review of wartime equipment had now been virtually completed and that the routine approval investigation of instruments and equipment, and the survey of their installation in prototype aircraft, had reached a satisfactory standard.

Whereas the generating capacity of civil aircraft in the immediate post-war period was about 6 kW, in modern civil prototypes this figure had risen at least tenfold, and in one case was as high as 160 kW. These higher powers had necessitated an increase in the voltage system from 24 to 110 volts, a fact which, combined with high-altitude operation, had led to a host of new problems. The use of electronic devices was also spreading rapidly; whereas electronics had previously been confined to communications equipment and navigational aids and, as such, had not vitally affected airworthiness, there was now hardly any field which had not been invaded by "valves." In this connection, the Board had taken the lead in bringing home to equipment and valve manufacturers a much better realization of the reliability essential for airworthiness. In future, a very high standard would be demanded for valves, on which, in many cases, the function of complete units of equipment would often depend.

The merger, on April 1st, 1950, of radio and C. of A. fees had enabled the Board to dispense with separate applications for radio approval. The practice of inspecting aircraft radio stations at three-monthly intervals had also been discontinued. On the Board's recommendation, a number of operators had prepared radio maintenance schedules and submitted them for approval, thus clearing the way for the introduction of relevant legislation by the M.C.A. The first Comet to be completely equipped with "dragless" aerials had satisfactorily completed a radio flight-test schedule and similar schedules had been prepared for the prototype Ambassador and the Viscount 700 and 701.

Following discussions with the M.C.A. towards the end of last year with a view to restricting C.s of A. for ex-military aircraft, it was subsequently announced that no new certificates would be issued for aircraft designed solely to pre-war or wartime military design requirements. The Ministry had now authorized the A.R.B. to renew C.s of A. on its behalf, and operators would benefit accordingly.

The requirements for glider- and banner-towing were reported to be under consideration at the present time, owing to the increase in this type of flying. The number of licences, both issued and renewed, for aircraft maintenance engineers had been less than for some time previously, but this had been offset to some extent by the ever-widening field of subjects with which the examiners now had to be conversant.

An interesting section of this year's report was that detailing the nature and extent of assistance which has been rendered through the A.R.B.'s overseas organizations to foreign countries. We reproduce the section here in a summarized form.

British West Indies: The field of the Board's work in this area was recently extended to cover the Bahamas; 18 aircraft are registered.

East Africa: The volume of work on behalf of the East African Government has necessitated the posting of a further surveyor to the area; the number of aircraft registered is 126.

Egypt: The staff at the Cairo Office now undertake surveys on behalf of most of the Middle East countries.

Iceland: Since 1949 a surveyor has been in residence at Reykjavik as advisor to the Government department responsible for airworthiness. He has taken part in many flying operations, including visits to the Arctic Circle.

Malaya: Early this year agreement was reached with the local Government enabling the Board to re-establish its organization within this country. The surveyor also acts as advisor to the Malayan government; some 37 aircraft are registered.

Montreal: This office functions largely as a liaison with I.C.A.O., but is also valuable as a means of direct contact with U.S. constructors.

Pakistan: The office established at Karachi is concerned mainly with advisory work for the local Department of Civil Aviation.

West Africa: The governments of the four West African Colonies have been assisted with airworthiness matters since 1947; main activity is centred around the fleet of West African Airways.

Lord Brabazon's report concluded with a statistical summary detailing the numbers of licenced examinations conducted, certificates awarded and surveys undertaken during the past year. It included the information that the total number of aircraft on the A.R.B. register is now 1,786 (as compared with 1,920 in 1950). Of the total, 1,206 aircraft are now in possession of valid C.s of A. Forty gliders and sailplanes also possess valid C.s of A. The total number of current Aircraft Engineers Maintenance Licences held is 3,889—slightly fewer than last year—while the number of A.R.B. approved firms has now reached 1,378.

THE AIR REGISTRATION BOARD consists of 18 members, 16 of whom are appointed by the industry, and the remaining two by the Ministry of Civil Aviation. "Group" abbreviations used in the list are explained at the foot of the column.

Chairman: The Rt. Hon. Lord Brabazon of Tara, M.C., P.C. (Ind). **Vice-Chairmen:** Sir Maurice Denny, Bt., K.B.E. (Con), Guy F. Johnson, C.B.E. (Ind), A. B. Stewart (Ins). **Members:** Capt. M. J. R. Alderson (M.C.A.—Pilots), A. G. Elliott, C.B.E. (Con), Marshal of the Royal Air Force Lord Douglas of Kirtleside, G.C.B., M.C., D.F.C. (Ops), E. R. H. Hill (Ins), Capt. A. G. Lamplugh, C.B.E. (Ins), L. Murray Stewart (Ins), J. D. North (Con), Capt. G. P. Olley, M.M. (Ops), Col. R. L. Preston, C.B.E. (Ops), F. E. N. St. Barbe (Con), Whitney Straight, C.B.E., M.C. (Ops), J. J. Taylor, O.B.E. (Hon. Treasurer) (M.C.A.—Public), Major R. H. Thornton, M.C. (Ind). **Chief Executive and Secretary to the Board:** R. E. Hardingham, O.B.E. **Chief Technical Officer:** W. Tye, O.B.E.

Groups: Con—Constructors. Ops—Operators. Ins—Insurers. Ind—Independent. M.C.A.—Nominated by Ministry of Civil Aviation.

SERVICE AVIATION

Royal Air Force and Naval Aviation News

NAVAL VISITOR: When the Parliamentary Secretary to the Admiralty, Mr. L. J. Callaghan, M.P., visited H.M.S. "Illustrious" last week to watch the Venom deck-landing trials, he travelled in an Avenger in company with Rear-Admiral Abel-Smith. The Avenger was catapulted off from Farnborough and landed on the carrier, which was cruising in the Channel.

New Biggin Hill Memorial Chapel

DESTROYED by fire in December, 1946, St. George's Chapel of Remembrance at Biggin Hill is to be replaced. Air Chief Marshal Lord Dowding, who was A.O.C-in-C. Fighter Command during the Battle of Britain, will lay the foundation stone of the new building at 4 p.m. on Wednesday, July 25th.

The chapel will be a memorial to the 453 pilots from the Biggin Hill sector of No. 11 Group, Fighter Command, who lost their lives. Over £6,000 has been subscribed by relatives and friends of the fallen. The original building was of wood but the new chapel will be brick-built, though of the same general design.

R.Aux.A.F. Call-up

LAST weekend the nine R.Aux.A.F. squadrons which have been embodied for three months' continuous training with Fighter Command completed their call-up and were relieved by the remaining eleven auxiliary units.

On the occasion of their standing down, Air Marshal Sir Basil Embry, A.O.C.-in-C. Fighter Command, sent the following message to each of the nine commanding officers: "On the completion of your call-up I wish to thank all officers and men for their very valuable and willing contribution to the air defence of this country. I realize the call-up has caused a disturbance to your normal life but the sustained period of training and contact with the regular squadrons will be of lasting value to you all. The benefits obtained in the call-up have exceeded my best hopes."

Unlimited Jet Training

WHEN the Korean campaign started the R.A.F. increased by ten-fold its annual intake of pilot trainees—from 300 to 3,000. It has now been decided to train all the aircrew that can be enlisted, without limit.

The new jet trainer referred to by Mr. Henderson in Parliament is a side-by-side type and production of it will be extra to that of the Gloster Meteor 7 and de Havilland Vampire trainers.

At present there are four main factories engaged on building parts of the Meteor 7, which are finally assembled at the Gloster Aircraft Company's factory.

SEEING FOR HIMSELF: Air Marshal George Jones, Chief of the Australian Air Staff, at the controls of the new Commonwealth CA-22 trainer, which he flew during a recent visit to the R.A.A.F. station at Laverton, Victoria.

R.N. Promotion

CAPT. A. D. TORLESSE, D.S.O., R.N., at present on duty at the Admiralty with the Deputy Chief of Naval Staff, has been promoted to Rear Admiral.

In January, 1942, he was Assistant Director of the Naval Air Division and later, in the rank of captain, he served as Deputy Director of Naval Air Warfare and Flying Training. Since the war Admiral Torlesse has been Director of Air Equipment, and for a period commanded the carrier H.M.S. *Triumph* in Korean waters.

Navy Day at H.M.S. "Blackcap"

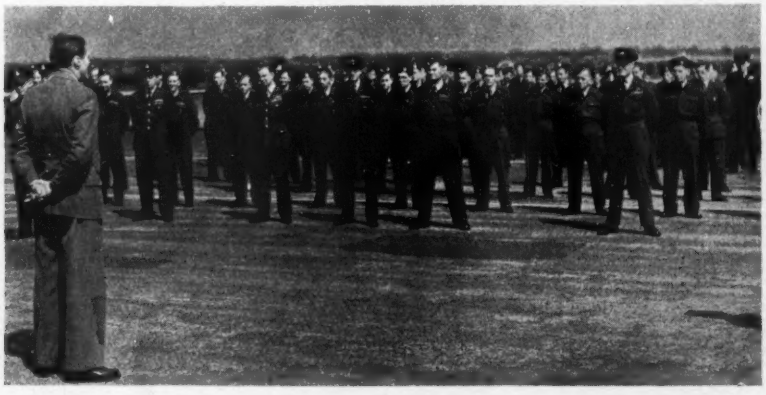
THE flying display taking place at R.N.A.S. Warrington during the afternoon of Saturday, July 28th, will include rocket-assisted take-off by Seafires, formation aerobatics by Sea Furies and an individual demonstration of an Attacker. The pilots of No. 613 Squadron, R.Aux.A.F. will show off their jets and the 12th Yorkshire Parachute Battn., T.A., will make demonstration jumps from a captive balloon.

An extensive static display is provided, including a very large model of the light fleet aircraft carrier H.M.S. *Triumph*. All proceeds are to be devoted to naval charities.

R.N.V.R. Increase

THE overall strength of aircrew in R.N.V.R. air squadrons is to be increased by allowing some 200 ex-pilots and 115 observers, mainly from the R.N. Volunteer Supplementary Reserve, to take service on List 2.

The training obligations of the List 2 pilots and observers are less than those on



AT NORTH WEALD: Mr. Aidan Crawley, Under-Secretary of State for Air, addressing members of Nos. 601 and 604 Squadrons, R.Aux.A.F., after they had been called up last weekend for three months continuous training with Fighter Command. Mr. Crawley served with No. 601 before the war.
"Flight" photograph

ROTOL

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Rotol since its formation in 1937 has made remarkable progress in the sphere of aeronautics. First in the field with many new products and closely associated with numerous world records, Rotol has made news and history. In addition to the design and manufacture of aircraft and marine propellers and aircraft equipment, the Company, engaged upon further projects, is keeping pace with the developments demanded by the British Aviation Industry.

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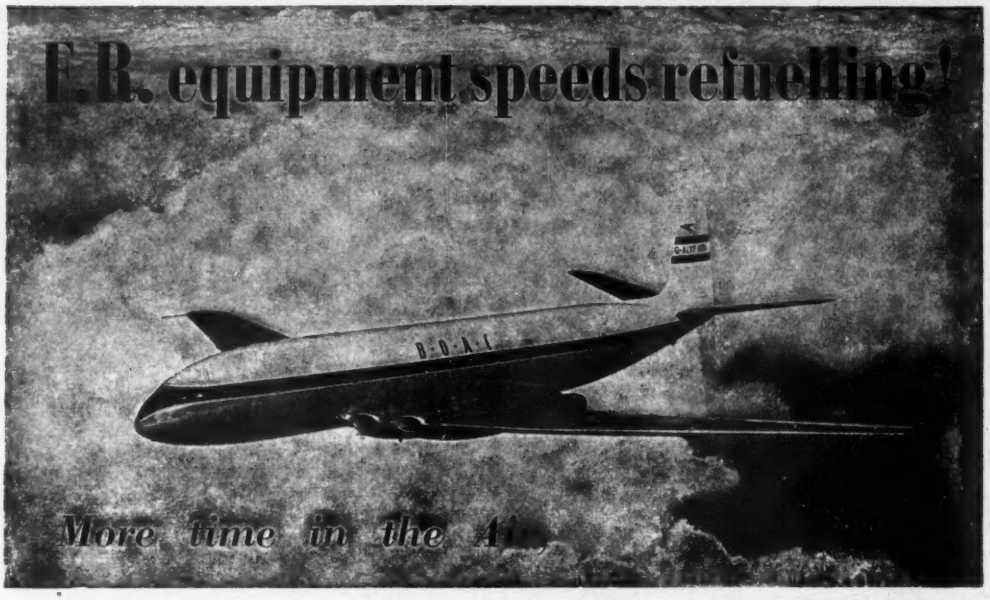

less time on the ground

The de Havilland "COMET," equipped with F.R. Pressure Refuelling Valves, is scheduled to be refuelled at the rate of 150 gallons (613 litres) per minute per hose: 6,000 gallons in 20 minutes.

Pressure refuelling is an important step forward in aircraft operation. Pioneered by Flight Refuelling Limited to meet the exacting demands of modern operating conditions, pressure refuelling offers a practical, inexpensive means of improving the utilization factor of aircraft. The advantages of pressure refuelling have been recognized for both commercial *and* military aircraft. All future aircraft will be improved by the introduction of pressure refuelling and the practice is certain to be adopted universally.

● *ADVANTAGES*

Refuelling a jet aircraft of 6,000 gallons capacity can now be carried out in *only twenty minutes* with F.R. Pressure Refuelling Equipment; under the old method, this might take *over two hours*. The annual utilization factor possible in commercial operation is thus substantially increased, and the delays and expenses incurred through long refuelling halts are avoided. Added to these gains are the savings in manpower and maintenance and the avoidance of damage caused by refuelling crews clambering over the aircraft. Further advantages are the convenience of using the maximum flow rates which are available from hydrant installations, both for refuelling and "defuelling," and the selective refuelling or "defuelling" of individual tanks to any required amount to suit the particular load/range case.

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SERVICE AVIATION . . .

List 1, who regularly fly with the squadrons. The pilots are required to complete fourteen days' continuous training, during which they do twenty hours' flying time, and a further twenty hours of non-continuous flying training each year. Alternatively more non-continuous training may be done instead of continuous training. Those who do not live near one of the squadrons may do their non-continuous flying training at R.A.F. Reserve Flying Schools.

List 2 observers must undertake fourteen days' continuous training, including up to twenty hours' flying time, to be carried out with one of the two anti-submarine squadrons or at the Navy's anti-submarine or observer schools.

The current establishments of engineer, air traffic control, medical supply and electrical officers in each squadron are also to be increased, so as to provide, a more efficient service at week-end and other training. Air-intelligence, meteorological and photographic branch officers are also required.

Auster Flies by Valetta

A MARK 6 Auster fitted with voice-amplifying equipment for making air-to-ground announcements has been built for service in Malaya.

After tests were completed at Rearsby the aircraft was flown to Wymeswold where it was partially dismantled and then loaded into a Vickers-Armstrongs Valetta for transportation to Singapore.

Operating from tiny airstrips cut in the jungle, Austers are giving very useful service in Malaya where communications, especially on the west side, are extremely scanty. No announcement has been made as to the exact purpose for which this "sky talking" Auster is wanted but, presumably, it is for propaganda talks to bandits hidden in the jungle.

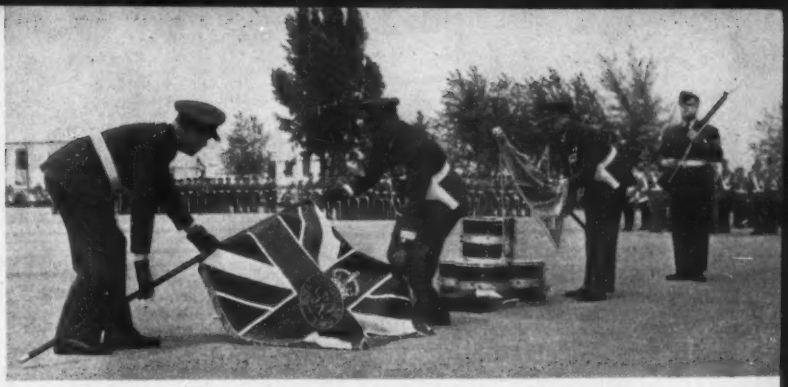
Air Lift Memorial Unveiled

THE unveiling of the memorial, erected by the West Berlin city government in commemoration of the aircrews who lost their lives while operating the airlift, was attended by some 80,000 people.

Dr. Reuter, the Lord Mayor, officiated and the A.O.C.-in-C. Transport Command, Air Marshal Sir Aubrey Ellwood, laid a wreath on behalf of the Air Council.

A. Cdre. J. W. F. Merer, who attended the ceremony on behalf of the C.-in-C. B.A.F.O., while expressing the appreciation of the Royal Air Force to the people of Berlin, said:—"To me this memorial symbolizes two things: firstly, the unprecedented way in which the free nations of Western Europe, together with the United States of America, combined to work wholeheartedly in a common effort for the preservation of freedom. Also the gallant way in which the people of Berlin maintained their morale, in spite of the privations and difficulties endured during the blockade. It is heartening, in these dark days, that peoples can forget the past strife and past hatreds in a common and just purpose. This has been done here in Berlin. Secondly, this memorial symbolizes the spirit of the men engaged in the airlift. These men came from many countries and their homes were as far apart as Australia, Texas, Scotland and South Africa. Particularly we remember those who lost their lives. Flying has its own peculiar hazards at all times. These hazards are naturally increased during an operation such as the airlift, when the difficulties caused by bad weather and a congested air space have to be overcome. These men did not hesitate. They gave their best, as did their fellows on the airfields, in the administration and in Western Berlin. They did their duty and this is the best that can be said of any man."

The airlift memorial was designed by Professor Eduard Ludwig, and consists of three reinforced concrete columns each 60 feet high. These signify the three air corridors into Berlin down which 2,324,257 tons of supplies were flown to the city in more than a quarter of a million flights during the eleven months of the Russian blockade.



DRAPING THE COLOURS: The King's Colour and the Colour of the Royal Canadian Air Force being draped on piled drums prior to their presentation to the R.C.A.F. Training Command at Trenton, Ontario, during the recent Air Force Day celebrations.

A Year in the Korean War

CONGRATULATING No. 77 Squadron, Royal Australian Air Force, on the completion of a year's service in the Korean campaign, the Supreme Commander, General Ridgeway, described No. 77 as a magnificent group of fighting men. "The 1,105 missions and 3,872 individual sorties flown by this squadron have wrought heavy loss upon the enemy and written a new and gallant chapter in the already high tradition of the R.A.A.F."

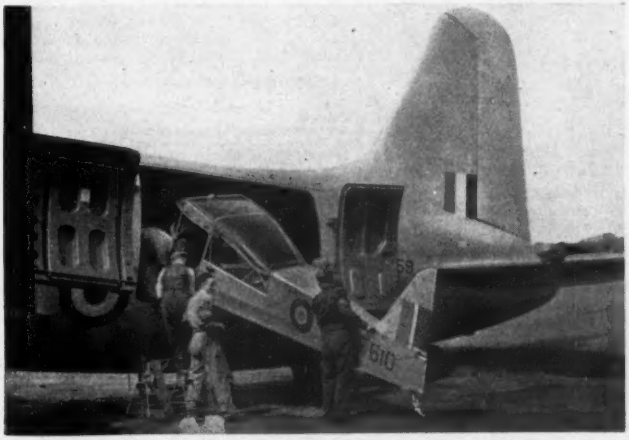
No. 77 Squadron was the first non-American unit (of any kind) to go into action in Korea.

Ex-navigators Wanted

UNDER a new R.A.F. scheme 500 ex-R.A.F. navigators are asked to volunteer for further aircrew service. Commissioned and non-commissioned aircrew up to the age of 35 are eligible. It is intended that they shall have equal career prospects with pilots and will receive the new rates of pay and flying pay. Those re-joining under this scheme will serve for periods of up to eight years' regular, and four years' reserve, service. During this time they may be considered for permanent commissions and extended service, leading to pensionable engagements. Those leaving at the end of their period of service under the new scheme will each receive a tax-free gratuity of up to £1,500 for an officer or £600 for an n.c.o.

R.E. Air Day

THE Royal Engineers Festival Air Day, which is due to take place at Rochester Airport from 2 p.m. on July 28th, will include an arrival competition, glider and A.O.P. Auster demonstrations and parachute descents. The R.A.F. will co-operate with aerobatics by a jet fighter and it is hoped that Lord Ventry's airship "Bournemouth" will be available to fly over the airport during the meeting. This last item would be most appropriate since the Royal Engineers Air Battalion of 1911 was brought into being "to create a body of airmen expert in handling kites, airships, balloons and other forms of aircraft."



PARASITIC FLIGHT: An Auster Mark 6, specially fitted for air to ground speaking, being loaded into a Vickers-Armstrongs Valetta for transit to Malaya. (See "Auster Flies by Valetta").

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Hatfield no Failure

EVERY man is entitled to his own opinion, but I would guess that for each one who agrees with Mr. F. H. Coates (Correspondence, July 6th) there are at least ten others who do not. The organizers at Hatfield were cursed with the worst possible luck so far as weather was concerned, but were nevertheless able to keep some sort of a programme going for a long afternoon, thanks to the co-operation and skill of some very experienced and outstanding pilots. The Comet demonstration, laid on at short notice was, I thought, an excellent effort by all concerned.

What your correspondent perhaps did not know was that almost from hour to hour the met. men kept giving rise to hopes of an improvement which would let some racing take place. As the whole affair was arranged primarily for the races it was the organizers' job to keep the ball rolling in order to be ready to flag the aircraft off at short notice. For this reason it would not presumably have been practical for competing aircraft (polished, lined up in order and with carefully calculated fuel loads) to be demonstrated. As it turned out, of course, the met. men were as surprised and disappointed as everyone else when the clamp continued.

No, I think brickbats were uncalled-for this time. If the tandard of the flying programme with fine weather gracing the occasion was going to be as good as the organization of the enclosures, traffic, and loud-speaker system (and who is to say it would have been otherwise?) then congratulations would have been the order of the day.

Worthing. R. D. BROWN.

[This is one of several opinions we have received disagreeing with those of Mr. Coates.—ED.]

B.O.A.C.'s New York to Bermuda Service

IN his "Commercial Aviation Commentary" (*Flight*, July 6th), your contributor, Allen Gale, says that the closing down of our New York/Bermuda service in March 1950 "was never fully explained." This is not so. We made it abundantly clear at the time that the reason for the suspension of the service was that with the merging of B.O.A.C. and B.S.A.A. there were not—regrettably—enough aircraft to go around all the routes of both airlines, including the former B.S.A.A. Central Atlantic route, which had been re-opened by B.O.A.C. from London *via* the Azores and Bermuda.

Mr. J. W. Booth, then a deputy chairman of B.O.A.C., said in March 1950, in a statement to the Press, that he would be disappointed if we were not operating again on the New York to Bermuda route in 1951. He explained that the Constellations then on the New York/Bermuda run were earmarked for the Central Atlantic service.

As you know, B.S.A.A. operated a service down the west coast of South America to Santiago (Chile) and B.O.A.C. had a problem and new commitments, therefore, when the merger of the two Corporations took place. There was no question, of course, of "running away in the face of the enemy" and we always intended to re-open the New York/Bermuda service as soon as possible. With the recent closure of the Santiago/Lima/Panama/Kingston sector, which we found to be very uneconomic, Constellations which operated on that route have become available for restoration of the Bermuda/New York service.

Regarding Allen Gale's hope that a more up-to-date aircraft than the Constellation 049 will eventually find its way on to the New York/Bermuda route, he omitted to recall that we have often indicated that we look forward to the day when we shall operate the de Havilland Comet four-jet airliner in the Caribbean and Bermuda area.

F. C. GILLMAN.

London, W.1. Chief Press and Information Officer, British Overseas Airways Corporation.

The Battle of Britain Film

I WAS interested to read the two paragraphs (in "Here and There" in the July 6th issue of *Flight*) dealing with the film *Hawks in the Sun*, now being made at Kenley, as I have observed the Hawker Hurricane in question in flight on several occasions during the past few weeks.

Usually it goes off in a north-westerly direction soon after taking off, but on one afternoon it cruised around accompanied by an Avro Anson.

However, twice during the past ten days a pair of Hurricanes have been flying in this neighbourhood though they flew low overhead on one occasion, I was unable to read their serial numbers, as they were painted in 1940-style camouflage, with the numbers on the fuselage-sides only.

I was under the impression that the Hurricane *Last of the Few*—or is it *Last of Many*?—is now the civil-registered Hurricane G-AMAU entered by Princess Margaret in the Royal Aero Club Jubilee Trophy Race.

I visited Kenley Aerodrome this morning but there was no evidence of Hurricanes or Spitfires, either airworthy or non-airworthy, though one side of the airfield was littered with film technicians and their impedimenta.

IAN H. GORDON.

Caterham, Surrey.

[We understand that G-AMAU, with its war-paint reassumed, has been used in the making of the film. The name of the aircraft is, of course, *Last of the Many*—we misquoted it. The Anson which our correspondent saw, was probably one that has been getting air-to-air shots for the picture. Additional information regarding 'Hurricanes' for this film will be found on page 60.—ED.].

CRANFIELD PRIZE-WINNERS

RECENTLY we referred to the annual prize-giving ceremony at the College of Aeronautics, Cranfield, at which speeches were made by Air Chief Marshal Sir Ludlow Hewitt (chairman of the board of governors), Vice-Admiral M. J. Mansergh (Fifth Sea Lord) and others. It is now possible to give a list of the awards made to students at the conclusion of the two-year post-graduate course:—

Diplomas with Distinction.—J. A. Laurmann, H. K. Zienkiewicz (aerodynamics); D. Howe, D. J. Mead, B. R. Noton (aircraft design); G. V. Cowmeadow, C. H. Pepper (aircraft propulsion); A. K. Hunter, B. C. Twiss (aircraft economics and production).

Diplomas.—R. A. L. Arkell, F. E. Bartholomew, M. Broad, P. A. T. Christopher, P. M. Davey, L. Kelly, D. R. A. Puttock, R. G. Rose, H. A. Simon, D. C. Stevenson, J. K. Turck, B. A. Tyler, M. C. Wilson (aerodynamics); C. M. Caldecott, R. Dawson, J. S. Elliott, G. H. Ellis, J. H. Grout, M. J. Henwood, E. J. W. Holt, J. R. Linge, J. G. A. Paterson, G. B. Tyler (aircraft design); B. V. Archer, W. H. Casley, T. M. Corson, P. E. Dale, J. F. Frank, J. Howieson, W. M. John, W. G. Jones, D. H. Jubb, H. D. Kapadia, C. S. R. Marshall, G. H. Nixon, V. R. Sinha (aircraft propulsion); J. G. P. King, H. J. Knevitt, T. Majewski, J. W. M. Steer, A. F. A. Watts (aircraft economics and production).

Certificate for One-year Advanced Course.—A. King (aerodynamics).

Governors' Prize (best all-round student of the course).—D. J. Mead.

Principal's Prize (best piece of original work by a second-year student).—H. K. Zienkiewicz.

FORTHCOMING EVENTS

July	16-21.	Conference on Automatic Control, College of Aeronautics, Cranfield.
July	18-22.	R.Ae.C. and Yorkshire Aeroplane Club: International Rally.
July	19-21.	*Daily Express* and R.Ae.C.: International Rally and "Fifty Years of Flying" Display and Exhibition, Hendon.
July	22.	Luton Flying Club: "At Home" (sponsored by A.B.A.C.).
July	21-29.	National Gliding Championships, Camphill, Gt. Hucklow, Derbyshire.
July	27-29.	Royal Netherlands Aero Club: Ypenburg Rally.
July	28.	Royal Engineers' Flying Club: Air Day, Rochester.
July	29.	Columbus Centenary Rally, Genoa.
Aug.	4-5.	Aero-Club de Touraine: International Rally, Tours, France.
Aug.	6.	*Daily Express* Challenge Trophy International Air Race, Shoreham Airport, Sussex.
Aug.	11.	Leicestershire Aero Club: Rally and Display, Leicester East Airfield.
Aug.	12-18.	International Air Circuit of Switzerland.
Aug.	18.	Wiltshire Flying Club: Thruxton to Isle of Wight Air Race.
Aug.	18-19.	U.S. National Air Races, Detroit.
Aug.	19.	Yorkshire Aeroplane Club: "At Home" (sponsored by A.B.A.C.).
Aug.	25.	Exeter Aero Club: Display.
Aug.	25-26.	Skegness Airport: Aerial Week-end.
Aug.	25 26.	International Air Circuit of the Dolomites, Italy.
Sept.	1.	R.N. Air Stations, Gosport and Lee-on-Solent: Air Display.
Sept.	2.	A.B.A.C. Summer Convention.
Sept.	3-7.	R.Ae.S. and I.Ae.S.: Third Anglo-American Aeronautical Conference, Brighton.
Sept.	3-8.	International Congress of Astronautics.

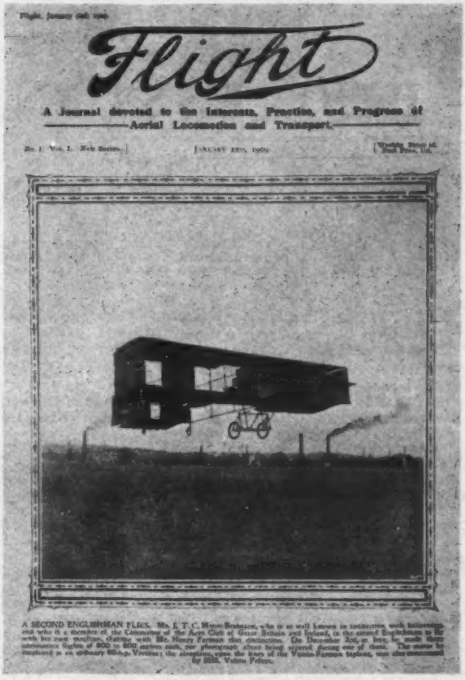
SOMETHING ABOUT OURSELVES

The First Leader: Hatching the Egg of Aviation in "Extraordinary" Offices

FRIENDLY allusions on other pages to *Flight's* own contribution to the cause of flying in Britain have emboldened us to outline the progress of this journal since its birth on January 2nd, 1909. This date, it may be explained, was that imprinted on "Vol. I, No. 1," though some eight numbers had appeared in preceding weeks for the purpose of securing copyright in the title. Even prior to that aeronautical matters had been dealt with for many years in a sister publication, *The Automotor Journal*.

Our founder, the late Stanley Spooner, who died on April 3rd, 1940, wrote in his first leading article: "It is not as a youthful stranger—entirely unknown to the aeronautic world—that we seek to introduce ourselves to everyone who is taking a special interest in mechanical flight; but rather is it as the dutiful offspring of a journal, which has for long earned the esteem of the same public, that we hope to make a successful appeal for *Flight* today. Up to the present time, when our own advent upon the scenes has synchronized almost exactly with the birth of a new era for humanity—the flying age—the pre-natal interests of the great industry which is, from now onwards, to be our special charge, have been cared for, and the way prepared, by *The Automotor Journal*. That parent journal has for many years assiduously chronicled all the early stages which have of late culminated so satisfactorily in the conquest of the air. But it now devolves on us, as a newcomer, to take up the running in columns of our own; since the time has undoubtedly arrived when the aeronautic movement can no longer be dependent on an automobile foster parent, however honoured that parent may be. It is, then, our firm determination to establish the same lofty traditions for *Flight* that have ever guided the editorial pen of *The Automotor Journal* in the automobile sphere, our chief aims and objects being ever to throw our full weight on the side of all that seems to us to make for the highest permanent good of the aeronautic industry, to pursue a policy of entire independence, and to render our pages as interesting, concise, and accurately instructive as lies within our powers."

From the outset *Flight* was accorded the honour of being the official organ of the Royal Aero Club, and has also enjoyed the happiest relations with the Royal Aeronautical Society, which saw fit to mark our coming of age with a dinner at the Savoy Hotel on January 3rd, 1930. Col. the Master of Sempill was in the chair, and many pioneer figures were to be seen in the company. Messages arrived from the patron of the Royal Aeronautical Society, His Royal Highness the Duke of York, and from other persons of rank and honour. The chairman recalled a letter from Lt. Col. Moore-Brabazon (now Lord Brabazon) which appeared in the first issue of *Flight*, and in which "Moore-Brab" referred to the difficulties of furthering aviation in this country, where everyone was "so ready to discourage one, ridicule one, and look upon one as an amiable lunatic." It was on this occasion that "Moore-Brab" recalled meeting Mr. Spooner in the old *Flight* office in St. Martin's Lane, which he described as one of the most extraordinary he had ever seen. It was, he said, like a huge pantomime wastepaper basket, in the middle of which sat Mr. Spooner, looking for all the world like a large old hen, hatching the egg of aviation.



Title page of "Flight," No. 1, Vol. 1, the first issue apart from eight or so to secure copyright in the title. Depicted is one of "Moore-Brab's" first flights, at Issy, on a Voisin biplane.

C. M. Poulsen, editor from 1934 to 1949, writes of his former chief and the early days in the following terms: "That the first few years of *Flight's* existence was a struggle may well be imagined. Most of the aeroplanes built and flown were produced by impecunious experimental enthusiasts, who certainly had no money to spare for supporting by advertising a journal which, they fully realized and willingly conceded, was doing excellent propaganda work. A few there were who were reasonably well capitalized, but the revenue from advertising was almost microscopic during the first few years. From the very first, Mr. Spooner foresaw the tremendous strides which the aeroplane would make in the matter of speed, range and load-carrying capacity. He was not a technical man, and possibly because of that he refused to be disheartened by the innumerable problems which stood in the way of realizing the ambitions of the early aviators. He would draw a parallel with the evolution of the motor car, a period with which he had been closely associated, and would argue that there was bound to be even greater possibilities in the development of the aeroplane. His judgment invariably proved right, although it was based upon intuition rather than technical knowledge."

For several years the late G. Geoffrey Smith, whose death it was our sad duty to record in a recent issue, acted as adviser to Mr. Spooner and entered into an agreement on behalf of Iliffe and Sons, Ltd., to acquire the journal on Mr. Spooner's retirement. In 1934 it was transferred, with its staff, to Dorset House, the present publishing office, and at this time Mr. Poulsen was appointed to the editor's chair.

The retirement of Mr. Poulsen was marked by a luncheon given by the management committee of the Society of British Aircraft Constructors in June, 1949. On that occasion one of his oldest friends, Mr. Robert Blackburn (a message from whom we are privileged to print in this issue), referred to the "sane and balanced way" in which the products of the British aircraft industry had always been presented in the pages of *Flight*.

The present editor took over on June 1st, 1949, and, with the staff whose names are set forth on our title page, endeavours to uphold the traditions so diligently established and jealously guarded over the best part of half a century.

(Left to right) Stanley Spooner, C. M. Poulsen, G. Geoffrey Smith.

PROFESSIONAL JOYRIDER

Looking Back on Nearly 40 Years of Flying with a Camera

By JOHN YOXALL

Illustrated with his "Flight" Photographs

THE author of this article is "Flight's" "oldest inhabitant." In the space available he has reminisced over some trips in just a few of the nearly 300 aircraft types in which he has flown during the past 38 years.

I AM not sure that 60 m.p.h. in an Avro at 500ft was not more exciting than ten times that speed in a Meteor above the clouds. It may be, of course, that by the time my first ride in a Meteor 7 came along I was no longer a tyro at the business . . . but everything in its place.

In 1913, at the age of 16, as the junior member of the staff of *Flight*, at the princely salary of 17s. 6d. per week, I counted myself lucky to be connected with this new-fangled flying business. Flights in aircraft were not come by easily in those days, and an *Evening News* placard at Charing Cross, "BOY OF 12 FLIES," brought the highest pitch of consternation. There was I, four years older, in a privileged position—and I had never flown. From that day onwards my immediate boss, one "Pop" Smith, got no peace until he persuaded J. L. Hall to take me up at Hendon in his 50 h.p. Gnome-engined Avro—the pre-504 type. The laced fuselage fabric, the padded leather edge to the cockpit, the smell of burnt castor oil (all the rotary engines were lubricated with castor), the rhythmic engine-torque rock of the biplane on its undercarriage bungee as Hall operated the "blip" switch—all these clearly stand out in memory. Yet the actual sensation of flying, from the moment the on-and-off splutter merged into a steady note for take-off, is forgotten. The gale in one's face and the fear in one's heart doubtless had much to do with this fact. There was a hazy idea of clouds and fields and houses but of Hendon there was not a sign until the steady note of the Gnome engine again gave way to a *brrrp—brrrp—brrrp* as the Avro landed.

Only one more flight came my way before the outbreak of the 1914-18 war. This was a very short circuit in one of the open "box-kites," the enjoyment of which was spoilt by my failing to tuck my trousers properly into the tops of my socks in accordance with the standard practice at that time; properly executed, it prevented the draught from blowing directly up one's garments and out at the cuffs where the hands held the interplane struts.

Like many other young men of my age, I greeted the outbreak of war with enthusiasm and rather than take the risk of waiting for an opportunity to enter either of the air Services—most people thought the war could not possibly last more than six months—I spent the next three and a half years as an army sniper. There was no flying to be had. Eventually, however, while serving in the Middle East (oddly enough, it was then known as the Near East; it became the "Middle East" only after aviation had shortened the journey from days to hours), I contrived a transfer and the infantryman's uniform was changed for the "maternity" jacket of the R.F.C.

In many ways it was fortunate that the transfer occurred in the Middle East, because obsolete types of aircraft such as Maurice Farman Longhorns and B.E.s were still in everyday use there.

The 50 h.p. Avro biplane of 1913, forerunner of the famous 504, which continued in service for joy-riding and training for over 20 years.

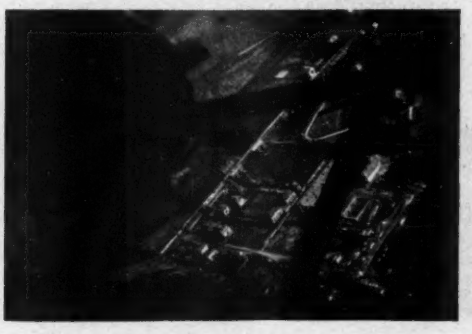
Flying in the former, one had the satisfaction of lining up the enormous front elevator with the horizon, indeed it held a fascination for both pilot and passenger; and in all the sub-types of the B.E.—2c, d and e—there was an unholy draught which came in over the low sides of the cockpits and whistled round one's back. The leather flying coats of those days were certainly necessary, even in Egypt, if flying above 4,000ft.

The R.E.8 was a much-maligned aircraft. It was the first to have tail-trimming gear and pilots were prone to forget to adjust the device properly. The upper wing extensions, which were braced from a very inefficient angle, used to flap in a frightening manner, but none was ever known actually to break in the air. For the R.E.8 we improvised a most effective device for bombing enemy transport on roads. It consisted of a 48-compartment box with a chain and sprocket-operated sliding base, cut off at an angle. Each division of the box was loaded with a Hales rifle grenade and, as the aircraft flew up the line of enemy traffic, the observer turned a bicycle crank to withdraw the base and release the grenades one by one.

One of the training types in Egypt at the latter part of the First World War was the D.H.6 which rejoiced in the sobriquet of "The Clutching Hand." It was in one of these that I first had the experience of flying backwards. Up one day during the strong *khamsin* winds, we found it possible to make headway only by diving with engine full on. Landing was finally accomplished by diving at the airfield and being literally pulled out of the sky by mechanics as we levelled off and were blown backwards. Thirty years were to pass before I flew in reverse again—this time in a Westland-Sikorsky helicopter.

In the gunner's compartment of an R.E.8 in 1917. The faired-in device on the side of the fuselage is a simple tube with cross-wires top and bottom; it served the double purpose of bomb and camera sight.

A spin as seen from the machine gunner's cockpit of a Boulton and Paul Bourges bomber. The hangars of Hendon Airfield can just be seen above the leading edge, at the bottom of the photograph.



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R.F.Dagnall testing his first pneumatic sailing dinghy on Wisley Pond, Surrey, 1918.

R.F.D. inflated canopy life raft designed for Imperial Airways, 1939.

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PROFESSIONAL JOYRIDER . . .

Just before the Armistice we gazed in wonderment at the Bristol Fighter, small numbers of which were arriving for operation over the Palestine front. Its ability to loop with scarcely any preliminary dive put it in a premier position among its contemporary two-seaters. Curiously enough, the opportunity actually to fly in a Brisfit did not come until some 12 or 13 years later, during an attempt to photograph a formation of Boulton and Paul Sidestrands. At the briefing it had been decided that, because the Sidestrands could fly as slowly as 85 m.p.h. and the Brisfit as fast as 95 m.p.h., there was 10 m.p.h. to play with. The leader of the Sidestrands (of No. 100 Squadron) achieved his 85 m.p.h. by climbing, a performance which the Bristol could not equal—even by cutting the corners.

In the early twenties few new types were produced; vast numbers of war-time machines were drawn from store and modified for any job in hand. All the early airliners were converted bombers, mostly Handley Page 0/400s and D.H.9s and 4s. A trip to Paris in a converted D.H.4 was not without interest. One sat facing the only other passenger, and the lid was slammed down and locked, leaving only a few inches of headroom. Conversation was carried on entirely by notes—pads and pencils were thoughtfully provided for the purpose—because engine noise made hearing impossible. This was hardly surprising, for the open ends of the exhausts were less than two feet from the passengers' heads. My companion,

A two-seater D.H.4 airliner departs for Paris from Waddon Airfield.

an actress, answered my sympathetic query as to why she was wearing crêpe bandage round her neck with, "As a cure for airsickness. It stops my head knowing what my tummy feels like. And it's just as well, because I feel awful."

At the same time an increasing number of twin-engined aircraft came into use, many of them being produced just too late to see service in the war. The D.H.10 and the Vickers Vimy (the latter was the type which made the first non-stop flight across the Atlantic) were two examples. Another, which came a little later was the Boulton and Paul Bourges; and it was in one of these, during a demonstration at a Hendon Display, that an attempt was made to get a photographic impression of a spin. The trip was my first experience of flying with F. T. ("Magic Hands") Courtney—and I was never so "demonstrated" in all my life. It was said that it took the riggers nearly a fortnight to get the Bourges right again; it was certainly some while before my own datum-line settled.

The Light Aeroplane Trials at Lympne in the early twenties produced a number of very clever aircraft—and some not so clever. The English Electric Company, of present-day Canberra fame, produced the tiny 3 h.p. Wren on which S/L. Longton averaged 87½ miles per gallon in the consumption tests. "George" Bulman, then a pilot at the R.A.E., brought over the R.A.E. Club's Hurricane (not *the* Hurricane) from Farnborough. Petrol feed trouble made him progress in a series of runs, each with a dive at the end to refill the carburetter float-chamber.

For the two-seater competition the next year George flew the Hawker Cygnet designed by Sydney Camm. This was a masterpiece in weight-saving, the a.u.w. being considerably less than 900 lb. As a passenger one had to be ultra-careful, because there was no floorboard in the passenger's cockpit, and if one's feet slipped off a convenient cross-member they went straight through the fuselage fabric.

While on the subject of insecurity it is interesting to recall a trip in the airship R.36 during a flight which she made to control the Ascot race-traffic in 1921. (The radio-equipped traffic police of today are not such a comparative innovation as many people believe them to be.) For this trip I joined the ship at Pulham where she floated, anchored to the mast by the nose, some 120 ft. up. The mast had no lift: one climbed a vertical ladder inside it. Halfway up, somebody above dropped a pile of signal books which, one recalls, had exceedingly sharp corners. From the masthead the final few feet were achieved via a flexible ladder extending to the ship's entrance-hatch at an angle of about 45 degrees. From the hatch—which was in the nose of the envelope—the cabin was reached via a 9-inch catwalk beneath the gas balloners. The ground engineers of today can be thankful that they do not have to "D.I." airships; the multiplicity of wires and girders had to be seen to be believed. As a means of travel it was wholly delightful—veritably the poetry of motion, for there was no smell or smoke or noise or dust. One was less comfortable, however, on hearing a knot of seven or eight passengers being quietly told to disperse gently, "without panic," because "not more than three people should stand together in case the structure gives way."

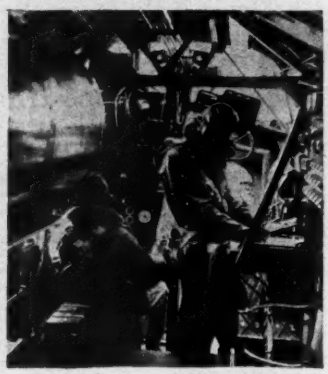
Returning to Pulham that night the ship had to be brought to the mooring mast in darkness, except for a searchlight directed on her nose. The silver nose, with the black shape of the rest of the ship outlined against a brilliantly starlit indigo sky, was an unforgettable sight.

My only other trip in the lighter-than-air realm was a curious mixture of modernity and the old-fashioned, for it was to make what must have been one of the earliest attempts at aerial infra-red photography by ascending in the basket of a kite balloon. The experiment was quite successful, but it was disconcerting for anyone accustomed to a battering slipstream and a roaring engine to be suspended in almost complete silence, to hear the cows mooing and the dogs barking down below, while from the envelope above came a gentle *sssssh* of escaping gas. Incidentally, S/L. C. F. Gordon, O.B.E., M.C., D.F.C., who took me up, was the only one-legged pilot with whom I have flown. Though he sported one of the genuine old-fashioned peg legs, he seemed quite oblivious of any feeling of insecurity caused by the fact that the rim of the basket came scarcely up to the waist.

By 1927 the R.A.F. were interested in the long-distance record. A Hawker Horsley was prepared and flown by Carr and Gillman non-stop to the Persian Gulf, but they held the record for only a few hours; then Lindbergh landed his Ryan monoplane in Paris after crossing the Atlantic. Their second attempt I followed in another Horsley, piloted by George Bulman. The take-off at Cranwell had been a hair-raising experience: there were no runways then, even for record attempts. Later, in the air, every

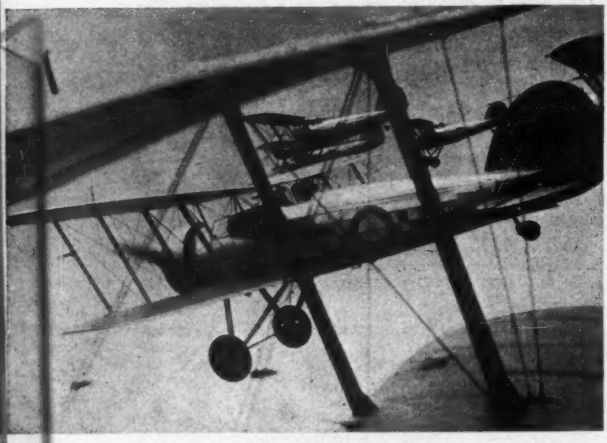
R.36 at the Pulham mooring mast. It's registration letters were G-FAAF.

Looking down from the basket at the handling crew of a kite balloon. The bags of ballast mark the area where the balloon rested on the ground.



Above: The Hinkler Ibis (two 45 h.p. Salmson engines) had all the makings of a very pretty little amphibian. Right: Interior of a Handley Page Harrow in flight. This was among the last of the really roomy bombers.

PROFESSIONAL JOYRIDER . . .

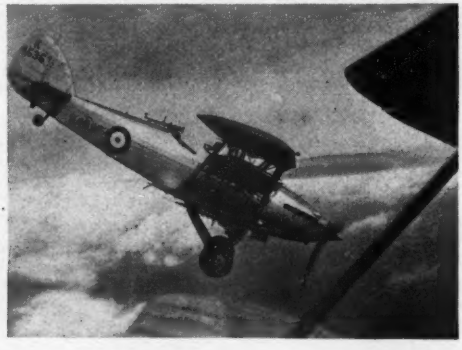


Odd man in: Flying in a two seater Bristol Bulldog in a No. 19 Squadron formation of Gloster Gauntlets at Henlow.

bump made the heavily overloaded Horsley lose height rapidly Several times Bulman put out his tongue in sheer anxiety.

There was no R/T. between the two aircraft, and when we began to see wisps of something coming from the tail of the record machine only sign language was available. At first it was thought

Diving in the Hawker Hart G-EBMR—which, after twenty years service, is still airworthy today—in company with a Hind.



that petrol was the trouble, but later, as the fuselage began to glisten wet in the sunshine, it proved to be oil. We had landed at Martlesham just in time to be ready for any eventuality when the other Horsley came in to make a thistledown landing at almost full overload.

This was a dull period for military aircraft until Faireys and Hawkers produced the Fox and Hart series. They proved to be the beginning of the end of open cockpits in first-line military aircraft—though, of course, such specialized machines as the Swordfish continued without any covering for the crew.

A Fairey Gordon in 1932 provided a spot of excitement. After we had photographed a formation of No. 40 Squadron the sergeant pilot flying me inquired whether, to lose height quickly, I minded a stalled turn or two. Having shut my camera bag and trapped it with my foot, I gave him the O.K., whereupon he promptly turned the Gordon over on its back and left it upside down. Fortunately I was able to grip the seat, otherwise I should have been thrown out. On arrival the right way up it was suggested that a more decorous manner of losing height would be appreciated. That pilot, incidentally, was lost and never seen again while flying down from Scotland a fortnight later.

Under the influence of commercial operators who wanted aircraft which would make a profit without subsidy, such machines as the Airspeed Ferry and D.H. Dragon were produced. Sir Alan Cobham's air circus had a Ferry, used for joy-riding. On the only flight I made in it there was a fellow whose girl friend would insist on pointing out to him how clearly she could see the cemetery—and by the look of him he expected to qualify for a place in it at any moment.

The most interesting trip in a Dragon was one from Stag Lane airfield to Southampton, where one engine was stopped and the return journey completed on the other. Capt. Hubert Broad, now of Dowtys, was at the controls.

This brings to mind another, more recent, incident which had a somewhat humorous sequel. Canadairs brought over a 4m and invited a number of Press guests to a trial flight. Above the clouds both port airscrews were feathered to demonstrate the machine's ability to fly comfortably on any two engines. Having photographed the two "dead" engines against a cloud background and published the picture under a caption beginning "No Deception," imagine the consternation in *Flight's* offices (and the sarcastic letters received) when it was found that the printers had put the illustration in upside-down.

The pre-war private-owner types did not provide much in the way of excitements for the passenger—they were expressly designed not to do so—but Sir Geoffrey de Havilland did once demonstrate to me how his Leopard Moth could be taken off, flown round and landed without the pilot touching the rudder pedals. F. G. Miles, too, had such confidence in his Miles Whitney Straight that, after a single circuit, and having given the instruction "drive downhill until the road levels out, then pull the stick back" he put his feet on the dashboard, held his hands high in the air for all to see, and left me to land it.

Two other interesting types in which but very few people ever had the opportunity to ride were the Hordern-Richmond Autoplane and the Hinkler Ibis. In the former I went down to the Goodwood estate of the Duke of Richmond and Gordon—after he had telephoned to have the ducal cows removed from the meadow in order that we might land safely. In the Ibis, which was meant to become an amphibian, Bert Hinkler demonstrated its view and control precision by asking me to point out exactly which dandelion I wanted him to land upon.

The greatest sense of advance in flying came, I think, with the Bristol Blenheim. Until its advent a straight flight was a somewhat dull proceeding unless, of course, one was above the clouds and enthralled by the aesthetic quality of the scene. With the

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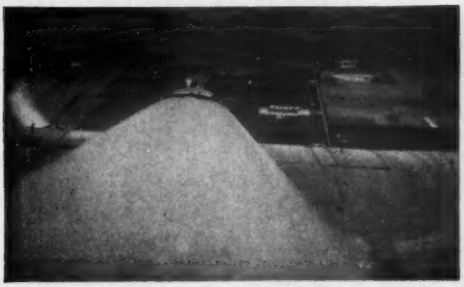


Hullo there! A long range picture of the late Chris Staniland taken from the rear gun position of the 1932 Fairey Hendon. The ground in the photograph is now London Airport at Heathrow.

PROFESSIONAL JOYRIDER . . .

Blenheim, even at heights of five or six thousand feet, the ground was noticed, for the first time, to be visibly moving backwards in relation to the aircraft.

What a nice aircraft the D.H. Flamingo was! Had the war not intervened to stop production it would have become a most popular civil type. It was uncomfortable, however, to fly in a formation of them (as Hertfordshires) without a gun between the lot if an Me 109 had happened to poke its nose through the clouds.

The Wellington was a gentleman and seemed prepared to do anything asked of it. In one of the very early models I flew over the Derby race crowds and later, as *Flight's* war correspondent, did 4½ hours over Dieppe trying to check up on any E-boats leaving harbour. An interesting feature of that flight was that it coincided with the opening of the V.1 campaign and that the height at which we had been briefed to fly was the same as that of the flying bombs. In ten-tenths cloud the beastly things passed all round us, looking like buckets of fire shooting through a fog. Incidentally, what our take-off load must have been can only be guessed, but after more than six hours' flying we had to drop six 500 lb bombs in order to get down to maximum permissible landing weight. All were dropped "safe"; all exploded. They were all of the then very secret air-pistol detonator type, designed to explode a few feet above the water's surface.

A form of flying which was a never-ending source of wonderment to me was that of the Beaufighter strike squadrons of Coastal Command. They would go out on pitch-black rainy nights, searching over the North Sea at 250ft to 500ft and putting their entire trust in the twinkling lights of a radio altimeter. The Beaufighter was the war correspondent's perfect aircraft; one could stand on the escape hatch behind the pilot and see everything that went on without getting in the crew's way.

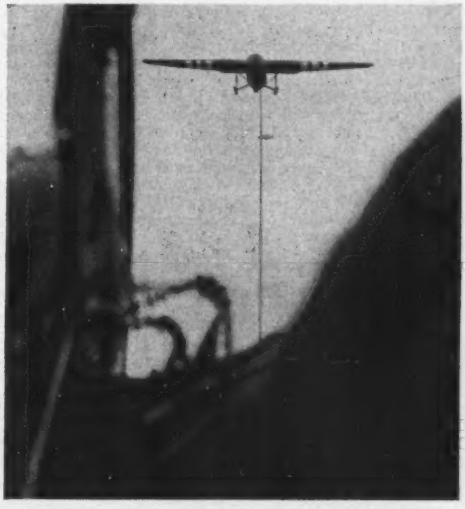
The same might be said of the Short Stirling. It was my privilege to fly in one and join that great armada of aircraft and gliders that left this country on September 17th, 1944, for the little town of Arnhem in Holland. Never did England look so lovely or the cloudscape so glorious as on that Sunday morning. It was the last sight of the old country for many, and it was appropriate that the farewell should have been so gentle.

For the variety of tasks it had to fulfil the Mosquito was undoubtedly the most versatile aircraft ever produced: a wartime airliner to Scandinavia, a bomber to Berlin, an intruder, a day bomber, a night fighter. Yet it was as a photo-reconnaissance machine with the Americans that I remember it best. Flying over the Dutch coast with a pilot who had been in the Eagle Squadron I asked him if he liked the Mossie. "Sure," he said, "it's a real good ship. We don't have many pilots good enough for it." Another six inches in width would have made the Mosquito comfortable.

The limit, for me, in piston-engined aircraft came with a trip last year in a two-seater Sea Hornet from Culdrose in Cornwall to Lee-on-Solent. Now sporting a waistline of plus forty, it was an exhausting job threading oneself into the tiny rear cockpit. For the first time, I must confess, the harness remained unfastened from sheer inability to reach the ends—but the ride reduced a journey of many hours to a matter of minutes.

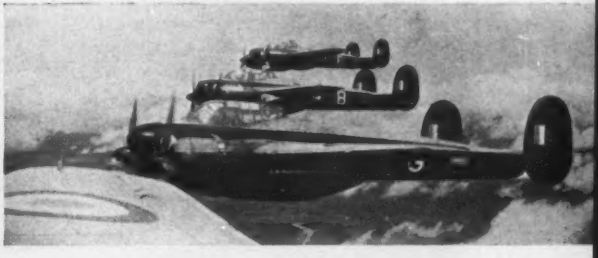
Frankly, there came a time recently when it appeared as if all the joy had gone out of flying. Great big geared airscrews driven by enormous piston-engines gave flying a brutal roughness. But now, with the coming of the jet, all the poetry, all the exquisite exhilaration of moving through space at will has returned. A flight in a Meteor 7 is a revelation—one becomes a lord of creation.

"The Beaufighter was the war correspondent's perfect aircraft . . ." A rocket attack as seen from behind the pilot's seat.



Over the rear gunner's shoulder: A peep at the Airspeed Horsa glider behind a Short Stirling on the way to Arnhem.

A taste of war in peace: Returning to base with other Bristol Brigands after attacking bandits in hiding in the Malayan jungle.



IN THE DAYS OF THE BALLOON

Recollections of some "Lighter-than-air" Adventures in Edwardian England

By - - - - - - HARRY HARPER

This remarkable photograph was taken, in 1903, by a remote-control camera slung from the rigging of a balloon flying at 4,000ft. In the car are seven aeronauts, nearly all of them famous then and since: Pollock, McClean, Dunville, Griffith Brewer, Hunt, Lockyer and Bidder.

THE author of this article made a number of balloon flights in the early days of which he writes. He was then "Britain's No. 1 air reporter," on the staff of the "Daily Mail." As will be apparent from other features in this issue, Lord Northcliffe's big cash prizes did much to encourage the pioneers of British aviation.

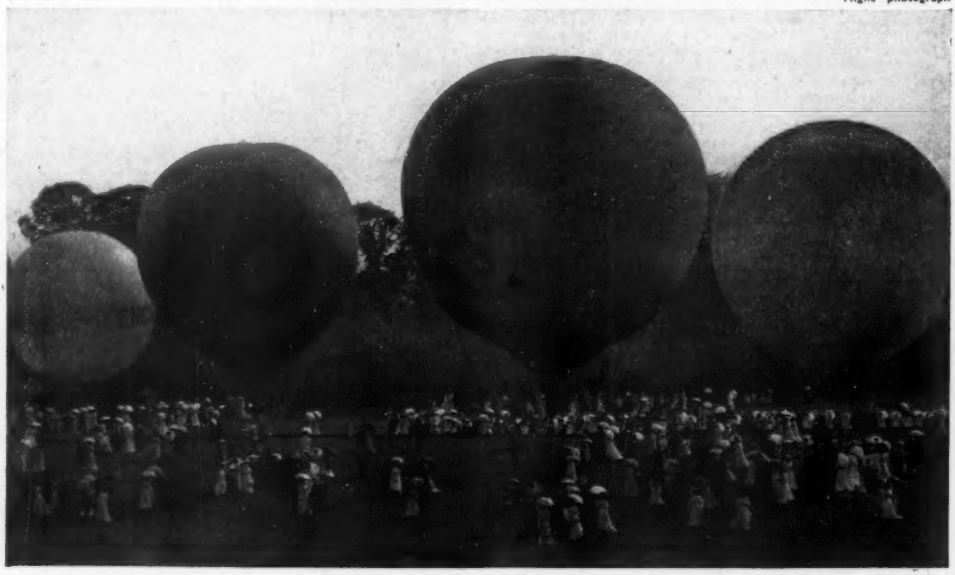
WHEN I first heard of the admirable plan for staging an exhibition at Hendon to celebrate the fiftieth anniversary of the forming of the Royal Aero Club, my thoughts on pioneer air days did not roam skyward as one might have imagined. On the contrary, they brought vividly to my mind a little scene which took place down in a cool wine-cellar beneath Regent Street, London.

This may sound distinctly odd, so let me explain. The pioneer aeronaut who was first to have the happy thought that early balloonists should form themselves into a club was one whose genial friendship I remember well—Frank Hedges Butler. It was with him, more than once, that I was privileged to make balloon voyages. And it was he, on that morning I am now recalling, who was seated in the little office he liked to use, in hot summer weather, down in the vaults which extended for quite some distance beneath his famous wine merchants' establishment in Regent Street.

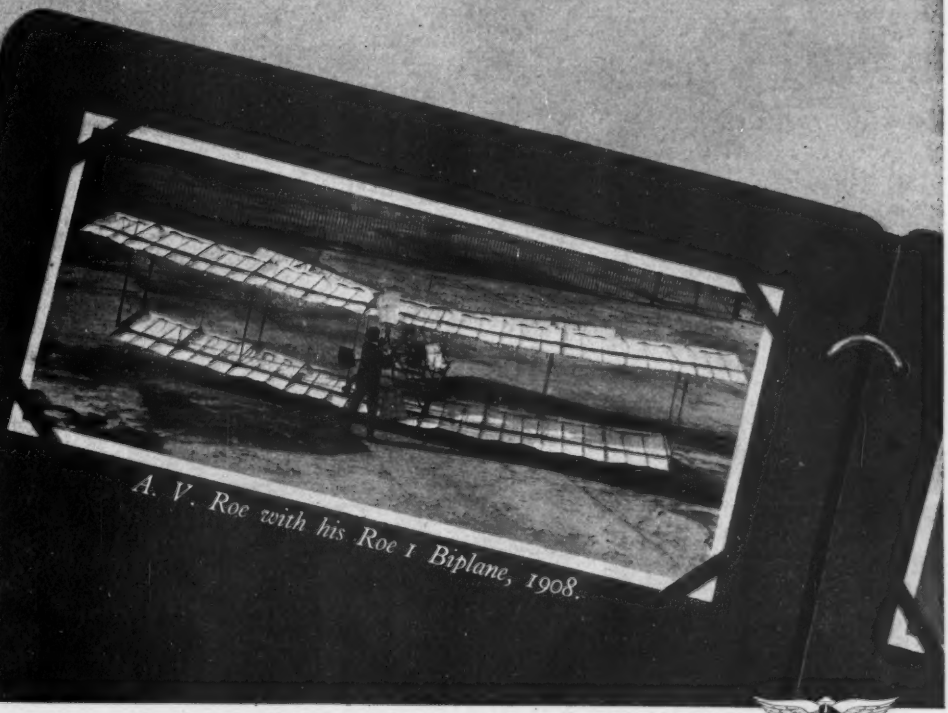
He had telephoned to ask me to drop in to discuss a night trip he was contemplating in his 45,000 cu ft balloon *Dolce Far Niente*; he intended to take with him his friend Dr. Lockyer, the astronomical expert, who hoped to make observations from the balloon of the Halley's comet which was, at that time, making one of its periodical appearances in the sky. There would be room, Hedges Butler said, for another passenger, and he was kind enough to suggest I might like to accompany them.

It was, I remember, a really hot summer morning. London

Edwardian dresses, sunshades, "toppers," trim lawns—a picture that breathes the spirit of the balloon meetings at Ranelagh and Hurlingham. "Flight" photograph



43 years of progress



A. V. Roe with his Roe I Biplane, 1908.

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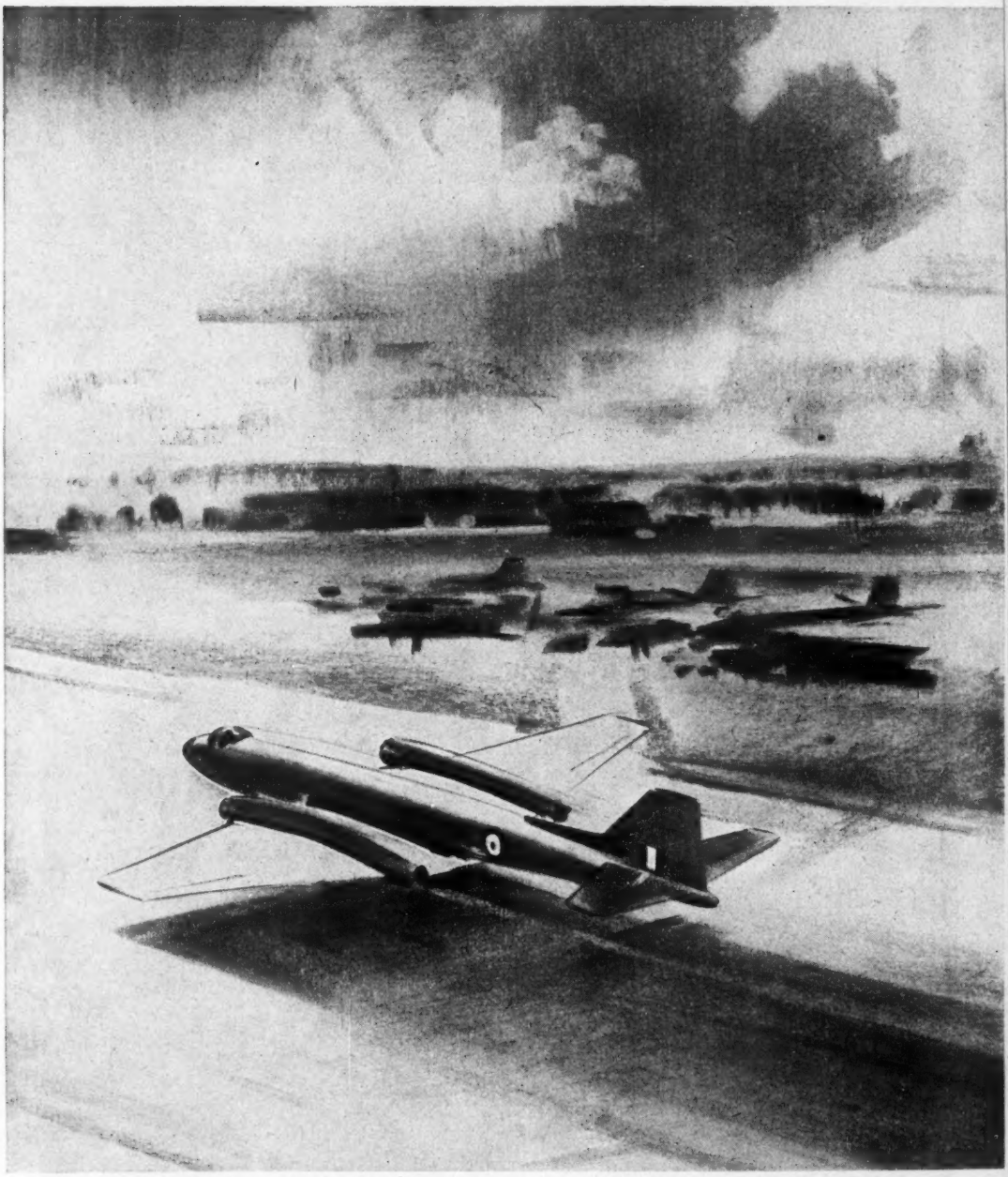

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IN THE DAYS OF THE BALLOON . . .

was, in fact, sweltering in one of the heat waves which we seemed to have fairly often in those Edwardian days, before "the English summer" became merely a rather stale jest. Delightfully cool it was down in that cellar, illuminated dimly with electric lights here and there. And the burly form of Hedges Butler, radiating an enjoyment in the good things of life which brings a nostalgic pang to one's mind in these days of austerity, seemed to have just the right sort of background in that cool oasis beneath London's West End.

What makes me remember this particular scene vividly is that, while we were chatting so comfortably, he was recalling for me his personal recollections of how, on September 24th, 1901, while up in the balloon *City of York*, the idea had come to him that the time was ripe for forming a club of pioneer balloonists—in order, as he explained, that more people should have an opportunity of enjoying this restful and most enjoyable way of travelling through the air.

He had ascended from the grounds of the Crystal Palace, and with him was his daughter Vera, who in those early ballooning days made many ascents with her father. As B. J. Hurren relates elsewhere in this issue, another great pioneer, not only of the balloon but also of motor car and aeroplane, was in the basket with them—the Hon. C. S. Rolls. They also had a professional aeronaut with them in the person of Stanley Spencer, one of the brothers who were so well-known in those days for their construction and pilotage of balloons.

For a couple of hours after ascending, there being very little wind, the balloon floated slowly above London, and then drifted on to make a landing at Sidcup, Kent. It was while they were high in the air over the metropolis that the scheme to form an aero club took shape. And on landing the necessary move was made to register the new organization as "The Aero Club of the United Kingdom." How it eventually became the Royal Aero Club is told elsewhere in this issue.

After I had told Hedges Butler, down there in his cellar under Regent Street, that I should be only too glad to make one of the party for the contemplated night flight, he pressed a bell on his desk, and from a neighbouring passage there emerged an elderly cellarman in his leather apron—a figure fitting in perfectly with the general scene. To him my host gave an order to produce a bottle of a certain brand of champagne; and that it was a good one I need hardly add, for Hedges Butler—as royal wine-merchant—was a world-famed authority on all the best vintages of the day.

"Flight" photograph

A great balloonist—the late Griffith Brewer—looks at pictures on the wall of his London office. This photograph was taken five years ago.

Frank Hedges Butler beside the basket of his balloon "Vera"—named after his daughter, who accompanied him on many of his flights.

And so down there in the cellar, in glasses of extra-special "bubbly," we drank to the success of our impending trip.

Although, eventually, that night flight did not prove suitable for observations of the comet by Dr. Lockyer, there being a lot of mist and cloud, it was from my point of view one of the most interesting balloon flights I was able to make in those memorable days. We went up from the Battersea Park gasworks. It was here, incidentally, that the Short Brothers had their works in two railway arches opening on to a grass plot between two of the big gas-holders. And it was from this same grass plot that our balloon ascended. Climbing slowly after our take-off, we drifted over the neighbouring railway, hearing more than once the shrill whistle of engines, and then we passed by degrees out beyond the metropolis, eventually coming down, early on the following morning, near Ashford, Middlesex.

It was while we were over some wooded country, in the middle of the night, that we heard the sound of someone chopping wood far below. Whereupon Hedges Butler took up a megaphone we had in the basket of the balloon and, bending over the side, called loudly: "Hallo down there!"

The wood-chopping ceased abruptly. We never heard another sound. What the nocturnal wood-chopper must have thought on hearing a sudden hail from up in the blackness of the sky, I have always wondered. It must have been an eerie experience for him.

Very calm and still it was when we landed in the early morning—so calm, in fact, that our balloon, after touching down gently at the edge of a path across some fields, just stood there motionless. A couple of policemen, on early-morning patrol, had caught sight of us from a neighbouring road. As they came hurrying across on their bicycles, Hedges Butler asked them if they would like the experience of going up in a balloon.

With some natural trepidation they assented, whereupon I clambered out of the basket and, while I held on to the rim to keep the balloon from ascending, they climbed into our basket. After which, while Hedges Butler released a little sand-ballast, and Dr. Lockyer and I held the trail-rope to keep the balloon from ascending more than a short distance, those two delighted policemen found themselves actually up in the air, peering down at us from over the side of the basket. When we pulled them down again, and while I still held on to the trail-rope, Dr. Lockyer took a photograph. I have always regretted that I never had the opportunity of seeing their official report on the encounter.

All our balloon descents were not so pleasant. I remember that after ascending one afternoon from Ranelagh we came down with the intention of landing in what looked, from above, to be a sufficiently big field. But it proved, when we actually got down into it, to be deceptively small. And we dragged right across it, finishing up with a loud splash in a particularly odouriferous cow-pond. What annoyed

IN THE DAYS OF THE BALLOON . . .

me about this incident was that on this particular morning, in view of the fashionable crowd I knew would be assembling at Ranelagh, I had bought myself a new straw hat. I still remember my feelings as I watched it floating slowly away on the scum-covered water. . . .

It was not long ago, in *Flight* [December 14th, 1950.—ED.], that Lord Ventry was explaining what a large amount of skill can be displayed in navigating a balloon. This was very evident to me, personally, in my studies of some of the most expert of our early Aero Club aeronauts. Two of the most skilful of them, who often found themselves in friendly rivalry, were Griffith Brewer and C. F. Pollock.

How keen those pioneer balloonists were to excel in their sport I can illustrate by a story about Griffith Brewer. The occasion was one of our international contests from Hurlingham, in which the winning balloon was to be the one alighting nearest to a point, down in the country, which was not chosen until the day of the contest—the final decision depending, of course, on the prevailing wind. Griffith Brewer had entered his balloon *Lotus*, while Pollock was piloting *Valkyrie*. As *Lotus* was of only 34,900 cu ft capacity, 7,400 cu ft smaller than the maximum size permitted by the rules for a balloon carrying three, Brewer attached a small auxiliary envelope to provide extra lift.

The night before the event, instead of going home to bed, Griffith Brewer went down to Hurlingham and spent the whole night in the basket of his balloon, covered by a tarpaulin. He adopted this spartan expedient because he wanted to be in a position to make a careful early-morning study of wind-currents before the formation of lower clouds had a chance of obscuring the upper strata.

As many as 30 balloons rose from Hurlingham in that particular contest, and I remember the day's happenings very well because I drove in a car from Hurlingham to Maidenhead, the "winning post" having been fixed in a field at Burchett's Green, about three miles from Maidenhead.

I recollect that for a time, just after starting, the air seemed full of balloons. Then they began to spread out across the sky, some to be carried by unfavourable currents far from their intended goal. The contest developed into a memorable battle of wits between those two wizards in balloon navigation, Brewer and Pollock. In the end, the former's early-morning wind studies stood him in good stead, so that he managed to bring *Lotus* down within 1,966 yards of the white cross in the field at Burchett's Green. This made him the winner, as Pollock's *Valkyrie* did not get nearer than 2,166 yards. Third place, with 5,533 yards, was taken by a well-known Belgian aeronaut, M. G. Geerts.

I particularly remember noticing, when I managed to reach the actual spot where *Lotus* had descended, the delight of Griffith Brewer's passenger, who was none other than that famous Edwardian sportsman, Sir Claude de Crespigny. It had been Sir Claude's job to plot the balloon's course on their map. And he was able to show me with what skill Griffith Brewer had manœuvred the balloon from one wind-current to another, by selecting various altitudes, so as to be always stealing nearer to the goal.

Of Pollock's prowess as an aeronaut, and of his coolness and judgment in an emergency, I had personal proof during an adventurous trip I made with him, and with Leslie Bucknall, in the latter's big 80,000 cu ft balloon *Vivienne IV*.

Bucknall had acquired this balloon in Paris, not long before, from that famous little air pioneer, Alberto Santos-Dumont, and one of Leslie's ambitions was to set up a new long-distance record by voyaging non-stop from London right across Europe, either to Siberia or to Mongolia. He had asked his friend Pollock to accompany him as co-pilot, and it was a real thrill for me when he telephoned to ask if I would like to make the third member of the party.

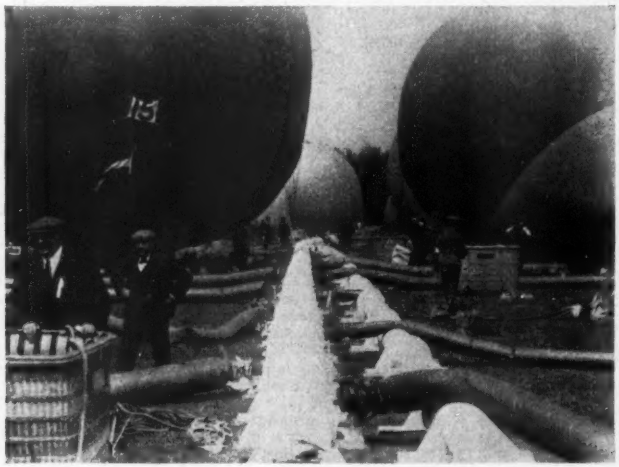
After this came tedious days of inaction while we were waiting for the right kind of weather, and more especially for the right kind of wind. At last, one afternoon, things seemed hopeful, and we ascended from the Wandsworth gasworks. But our favourable forecast soon proved wrong—as they so often did. Instead of an upper wind bearing us eastward, we had not been up long when we found ourselves in a northerly current of rapidly-growing strength. This was not what we wanted at all. And as that wind was rising quickly in strength, threatening to sweep us far up somewhere beyond the North Sea, it was decided that we must get down as quickly as we could, while land and not sea still lay beneath us.

To put such a big balloon as *Vivienne* down in a wind which was gusting, as it was then, up to something like gale strength, was no easy matter. But Pollock was cool, quiet, and completely equal to the occasion. He seemed, in fact, to be enjoying himself as he valved gas gently, and we lost height until we were speeding not far above the tree-tops at a speed approaching that of an express train. If Pollock and Bucknall seemed unperturbed, the same could hardly have been said of myself. I had never made a descent in conditions as bad as this before, and when I peered down at those trees, bending under the force of the wind, I must confess I felt far from happy.

But Pollock made a masterly job of it. As we shot low over a big wood, he saw several clear fields just ahead of us. It was now or never. Timing things admirably, he pulled the rip-cord which let out gas with a rush from the top of the envelope. Down we dipped, the basket tearing its way through a big hedge at the end of one field. Then, as the deflating envelope formed itself into a sort of parachute in the top of its netting, we dragged most of the way across the next field, finishing up with a jerk that turned the basket upside-down.

It was, under these difficult conditions, a quick and neat landing; things might have been more uncomfortable—though hardly so for me. As the basket overturned, the other two had managed to get clear. But I found myself half in and half out of it, with the rim of the basket pressing down on my neck, and threatening to suffocate me. I struggled to free myself. But some sand-bags were pinning me down, and my position was distinctly unhappy, to say the least of it, until the others lifted up the basket sufficiently for me to wriggle out.

But rough descents, as well as smooth ones, were, of course, all part of the game in those unforgettable days.



The pre-1914 balloon meetings were a profitable side-line for the gas companies, as this picture of an elaborately constructed filling-main suggests. On the left is Hedges Butler.

"Flight" photograph

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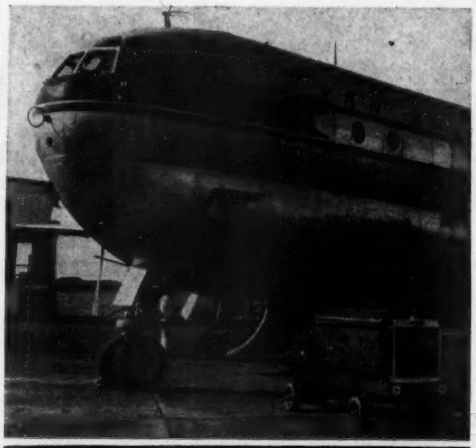

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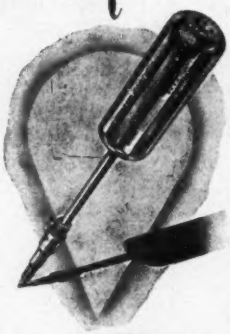

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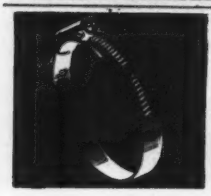

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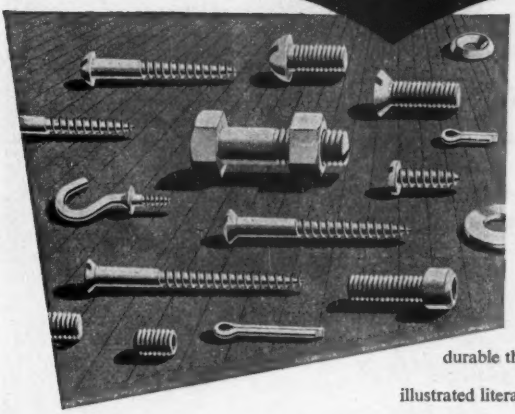

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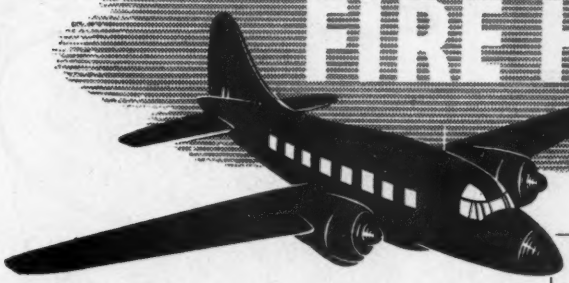

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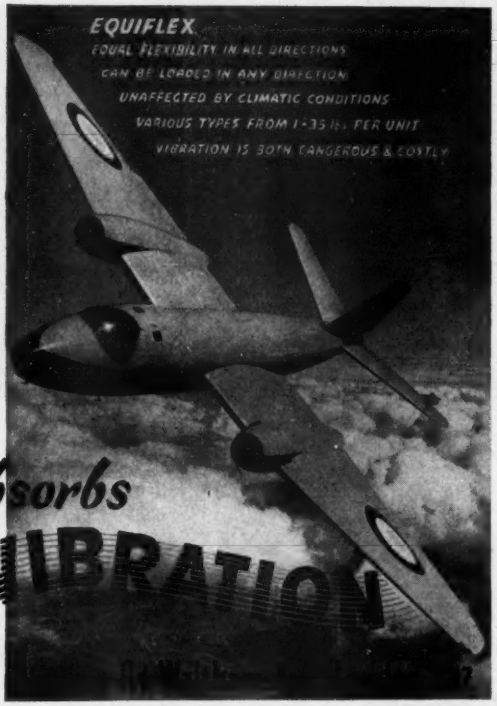

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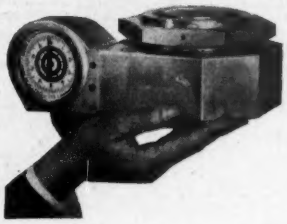

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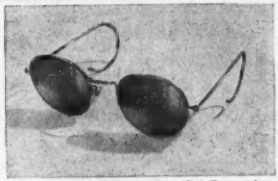

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(1) Naval cadetships (special entry).
(2) First appointments in the Royal Marines.
(3) Entry to the Royal Military Academy, Sandhurst.
(4) Royal Air Force cadetships.

A COMBINED competition will be held, commencing on October 30, 1951. A centre in Germany (British Zone) will be included in the list of centres for the written examination.

AGE limits:

NAVAL cadetships (special entry), 17 years 2 months to 17 years 10 months on November 1st, 1951.

FIRST appointments in the Royal Marines, 17 years 2 months to 18½ on November 1st, 1951.

ENTRY to Royal Military Academy, Sandhurst, 17½ to 19½ on November 1st, 1951.

ROYAL AIR FORCE cadetships 17½ to 19 on November 1st, 1951.

APPLICATION forms and conspectus of the competition may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1, quoting No. 1003/51. Completed application forms must be received by him by August 16th, 1951. [6649

THE COLLEGE OF AERONAUTICS.

PROFESSORSHIP OF AIRCRAFT DESIGN.

THE Board of Governors invite applications for the position of professor and head of the Department of Aircraft Design at the College. Applicants should have experience in at least one major branch of aircraft design or in research work closely connected with aircraft design. They should have held a senior position in the field mentioned and be capable of directing the activities of a large department of the College. The salary will be in the range of £1,700 to £2,000 per annum, depending on qualifications and experience, with superannuation under the Federated Superannuation System for Universities and family allowance. If the successful applicant is married, a house at a nominal rental will be available for occupation. Applications, giving full details of qualifications and experience and quoting the names of three referees, should be addressed to the Registrar, The College of Aeronautics, Cranfield, Bletchley, Bucks, and the envelope endorsed "Professor of Aircraft Design." Further information may be obtained from the Registrar if required. The closing date for the receipt of applications is August 15th, 1951. [6648

WESTLAND AIRCRAFT, Ltd., have vacancies for the following:

STRESSMEN (INTERMEDIATE AND SENIOR).

DRAUGHTSMEN. (INTERMEDIATE AND SENIOR).

TECHNICAL ILLUSTRATORS.

SPARES COMPILERS.

APPLY, stating age, qualifications, experience and salary required, to the Personnel Officer, Westland Aircraft, Ltd., Yeovil, Somerset. [6606

GLOSTER AIRCRAFT Co., Ltd. Vacancies exist in the Research Department for the following:

(a) Staff to work on the test and development of aircraft hydraulics, fuel and air systems, flight testing instruments and design of special testing apparatus.

(b) Staff for testing of aircraft structures and resonance testing of complete aircraft.

PREFERENCE will be given to men with engineering degree, but practical experience is essential. For vacancies (a), applicants must have, as well as a sound mechanical engineering training, a knowledge of electrical theory, elementary electronics, vibration theory and aircraft design and construction. Apply Employment Officer, G.A.C., Ltd., Hucclecote, Glos. [6913

APPLICATIONS are invited for the following positions in the London area:

DRAUGHTSMEN required for detail drawing of experimental designs of aircraft electrical equipment. Works experience essential. Write, giving full details in strictest confidence, to the Employment Officer, Rotax, Ltd., Chandos Road, N.W.10. [6636

AQUILA AIRWAYS, Ltd., invite applications in the following aircrew categories:—

(1) Pilots, preferably with flying boat experience, but training for conversion may be given to suitable land plane applicants.

(2) Radio officers, holding 1st Class licences.

(3) Flight engineers, with "A" and/or "C" licences on Pegasus(S.25.

WRITE, giving full details of experience and flying hours to 6, Curson Place, London, W.1. [6637

ADMIRALTY. Vacancies exist in the Aircraft Maintenance and Repair Department, Admiralty, London, for:—

(i) Temporary technical class grade III officers, and

(ii) Temporary draughtsmen.

CANDIDATES for both grades must be British subjects of 21 years of age and upwards and have served an apprenticeship, or had aeronautical engineering training, followed by practical experience in the repair and maintenance of aircraft (airframes, aero-engines or electrical equipment). In addition, drawing office experience will be required of candidates for the draughtsman vacancies. EXPERIENCE in the R.N., technical branches or in the A/E branch of the Royal Navy would be valuable for the posts at (i) above.

SALARIES applicable to both of above mentioned grades range up to a maximum of £575 per annum and will be assessed according to age, qualifications and experience.

APPLICATIONS, giving age and details of technical qualifications, apprenticeship (or equivalents), workshop and drawing office experience, should be sent to Admiralty (C.E.11 Room 88), Empire Hotel, Bath, quoting "AMRD." Candidates required for interview will be advised within two weeks of receipt of application. [6650

A VACANCY exists in the Technical Department for an engineer to assist in work connected with the vibration problems of aircraft.

APPLICATIONS are invited from engineers with suitable experience and mathematical ability.

WRITE, stating age, experience, salary required, etc., to the Personnel Officer, Saunders-Roe Ltd., East Cowes, I.O.W. [6643

PILOTS and Ground Staff required. Good wages. Apply at once, full particulars.—Starways, Speke Airport. [6978

TYPIST-CLERK required by Association of British Aero Clubs. Shorthand not necessary, but initiative is. Write A.B.A.C., 19, Park Lane, W.1. [6975

SITUATIONS VACANT

K.L.M. ROYAL DUTCH AIRLINES have vacancies for pilots, aged 30 or under, to enter service at the end of 1951.

PREFERENCE will be given to applicants who possess airline pilots transport licence and have experience on twin and/or four-engine aircraft, and who hold flight navigator licence or who have had long-range flying experience. Minimum of 600 flying hours.

CONSIDERATION will also be given to applications from pilots in possession of at least a commercial pilots licence with night and instrument rating.

DETAILS in first instance to Senior Station Manager, K.L.M. Royal Dutch Airlines, London Airport, Feltham, Middlesex. [6693

LICENSED aircraft radio maintenance engineer required immediately. Please write, Chief Engineer, Eagle Aviation, Ltd., Luton Airport, Luton, Beds. [6311

AIRCRAFT stressmen required.—Write, stating experience and qualifications, to Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge. [6652

AERIAL photographer required for vertical photography. Air navigator experience needed.—Box 299, Allardyce Palmer, Ltd., 109, Kingsway, London, W.C.2. [6646

TECHNICAL sales representative required, with knowledge of weighing equipment, particular reference aircraft industry. Preferably owning car. Salary and commission.—Box 2804. [6554

DRAUGHTSMEN required, 21-25 years, for experimental and research work in aircraft design and mechanical engineering. At least H.N.C. standard.—Tiltman Langley Laboratories, Ltd., Redhill Aerodrome, Surrey. [6653

DESIGNERS and senior and junior draughtsmen for work on gas turbine engines. Midland area. Experience not essential but an advantage. Apply to Armstrong Siddeley Motors, Coventry. [6616

JIG and tool draughtsmen required. Previous aircraft experience not essential. Pension and life assurance scheme. Apply, Employment Manager, Vickers Armstrongs, Ltd. (Aircraft Section), Weybridge. [6648

THE MINISTRY OF SUPPLY requires skilled research and experimental mechanics for precision light engineering work of an instrument-making nature, in various establishments throughout the country.

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DETAILS of other conditions of service will be supplied on application.

APPLY, giving particulars of apprenticeship, training (including Forces training), qualifications, and experience, to the Assistant Director, Ministry of Supply, T.P.A.2(a), Room 48, Ivybridge House, Adam Street, Strand, London, W.C.2, quoting D/494/51, and stating where prepared to serve. [6639

FOLLAND AIRCRAFT, Ltd., require a Section Leader with considerable experience of modern structural design. Apply to Personnel Manager, Folland Aircraft, Ltd., Hamble, Southampton. [6623

NORMALAIR, Ltd., Yeovil, invite applications from the following for work in connection with aircraft air conditioning, pressurizing, and high altitude breathing equipment:

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APPLICATIONS to the Personnel Officer, Normalair, Ltd., Yeovil, Somerset, must state age, experience qualifications and salary required. Where convenient selected applicants will be interviewed in towns near their address. [6804

ASSISTANT WORKS MANAGER required by Aircraft Constructors. Aircraft experience essential. Must have good engineering background and training. Full details of experience, etc., to Box 2696. [6615

BROOKLANDS AVIATION, Ltd., have vacancies for airframe and engine fitters, electricians and woodworkers for servicing and repair of R.A.F. aircraft. Good wages and piecework bonus.

APPLY: No. 4 Site, Sywell, Northants. [6308

JIG and tool draughtsman required, fully experienced. Applications, in writing, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [6593

WANTED, flight engineers for York aircraft. "A" and "C" to cover York aircraft essential.—Apply: Chief Engineer, Eagle Aviation, Ltd., Luton Airport, Luton, Beds. [6310

APPLICATIONS are invited from design draughtsmen and stressmen; also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.

APPLICATIONS should state full particulars of experience and qualifications and should be addressed to The Personnel Manager, The de Havilland Engine Co., Ltd., Stonegrove, Edgware, Middx. [6575

SKILLED detail and assembly fitters, turners, borers and millers urgently required. Apply, giving full details of experience, to Personnel Officer, Westland Aircraft, Ltd., Yeovil, Somerset. [6527

SENIOR DRAUGHTSMEN required in Bedfordshire for work on an interesting project. Applicants having experience of radio, aircraft, or light mechanical design, should write giving details of qualifications and experience and mentioning ref. ADD to Box No. 2666. [6308

SCHEDULE clerks required (male), with experience in compiling M.O.S. spares schedules. Applications, in writing, stating age, experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds. [6596

MECHANICAL, structural or general engineering draughtsman wanted for aircraft work; previous aircraft experience not essential; pension and life assurance scheme. Apply: Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge. [6565

HANDLEY PAGE, Ltd., have a vacancy for a technical illustrator with previous experience in aircraft work. —Write, stating age and full details of experience, to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [6597

URGENTLY required for high-class precision work: instrument fitters, assembly fitters used to fine limits, universal millers and capstan setter operators. Apply, giving full details of experience, etc., to Personnel Officer, Normalair, Ltd., Yeovil, Somerset. [6525

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Write or phone for interview

SITUATIONS VACANT

NAVIGATING officers required by Eagle Aviation, Ltd. Minimum qualification: flight navigator's licence.—Apply to Operations, Luton Airport. [6663

FOLLAND AIRCRAFT, Ltd., require senior and intermediate stressmen for extremely important and most interesting work at Hamble.—Write, giving age, qualifications and experience, to the Personnel Manager, Folland Aircraft, Ltd., Hamble, Hants. [6566

EXPERIENCED airframe fitters required for work on R.A.F. military metal and composite aircraft. Long-term contracts. Union rates and bonus. Assisted travel. Canteen, etc.—Apply, Airwork, Ltd., Gatwick Airport, Surrey. [6597

GLOSTER AIRCRAFT Co., Ltd., have vacancies for senior jig and tool draughtsmen and illustrators.—Write, giving full details of previous experience, age, and salary required, to Employment Officer, Gloster Aircraft Co., Ltd., Hucclecote, Glos. [6602

TECHNICAL authors and illustrators required. Knowledge of M.O.S. procedure desirable.—Applications in writing, stating age, experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds. [6594

GLOSTER AIRCRAFT Co., Ltd., have vacancies for fully experienced aircraft structural and electrical draughtsmen.—Applications, in writing, stating age, experience and sala.y required, to Employment Officer, G.A.C., Ltd., Hucclecote, Glos. [6910

UNIVERSAL FLYING SERVICES, Ltd., have a vacancy for a Link Trainer Instructor for No. 18 Reserve Flying School. Previous Link experience preferred, but not essential.—Apply, Secretary, Universal Flying Services, Ltd., Fair Oaks Aerodrome, Chobham, Surrey. [6618

TECHNICIAN (male or female), required in the Development Research Laboratory of the Aircraft Division of The Bristol Aeroplane Co., Ltd. Duties include the supervision of a small group of technicians engaged in the testing of materials, rivets, etc.

APPLICANTS should be of Degree or Higher National Certificate standard with preferably some previous experience of this kind of work.

REPLY, stating age and qualifications, to the Personnel Manager, The Bristol Aeroplane Co., Ltd. (Aircraft Division), Filton House, Bristol. [6612

STRESSMAN required for work on new and interesting projects. Experience of wing and fuselage stressing essential. Applications, stating full qualifications and previous experience, also stating salary required to: Ref. F.11.—Box 2638. [6670

FLYING instructor and secretary required to take charge of flying club. Employment available for wife to operate catering. Limited living accommodation if required.—Leicestershire Aero Club, Ltd., c/o 11, Cank Street, Leicester. [6645

SENIOR weight engineers required. Interesting work on new projects. Permanent positions offered to suitable applicants.—Apply, stating age, experience, qualifications and salary required, to Chief Designer, Gloster Aircraft Co., Ltd., Witcombe, Glos. [6912

AIRFRAME and engine fitters used to C. of A. overhaul work on Hythe flying boats required immediately. Standard rates of pay in accordance with national award will be paid to suitable men.—Please apply by letter to Technical Manager, Aquila Airways, Ltd., Hamble, Nr. Southampton. [6581

DOWTY EQUIPMENT, Ltd., Aircraft Hydraulic Engineers, Arle Court, Cheltenham, require design draughtsmen, preferably with some knowledge of hydraulic and landing gear components for aircraft.—Write: Personnel Manager, giving details of training and experience, and mentioning age and salary range. [6660

TECHNICAL assistant for vibration research on aero-engines. Specific experience of this work not essential if well qualified to undertake experimental investigations. —Write, stating age, qualifications and previous experience, to The Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [6611

STATISTICIAN required (male), to compile flying records and returns and keep personnel records (Kardex) for a Reserve Flying School. Excellent opportunity for ex-R.A.F. Orderly Room senior N.C.O.—Apply: Secretary, Universal Flying Services, Ltd., Fair Oaks Aerodrome, Chobham, Surrey. [6619

AIR ENTERPRISES, Ltd., Renfrew Airport, Glasgow, urgently require captains and radio officers. Agreed rates of pay and conditions of employment plus flying bonus. Minimum qualifications: commercial pilots licence and instrument rating, R/T licence, radio officer's 1st class licence. [6636

STRESS calculator. Experienced man required by aircraft engineers in Midlands. Must hold Higher National Certificate or equivalent qualifications. Excellent prospects for keen and competent man.—State fully details of experience and qualifications, age and salary required to Box 2705. [6624

AIRCRAFT FITTER ASSEMBLERS required by de Havilland Aircraft Co., Hatfield, offering good working conditions, modern equipment, opportunities for advancement, superannuation scheme, sports club, etc.—Apply by telephone, Hatfield 2345, in person, or by letter addressed to Personnel Manager. [6621

PRESS tool designers are required by large engineering company in the Southampton area. Applications are invited from men with the necessary tool-room and draughting experience. High salary and good prospects for men with required ability.—Write, Box 3651, A. K. Advs., 212a, Shaftesbury Avenue, London, W.C.2. [6632

AIRCREW! Immediate appointments are available to pilots and R/O with a prominent charter company. Good salary and conditions. Superannuation scheme. Minimum qualification: commercial pilot licence with Viking endorsement. Full particulars, in confidence, to Personnel Officer, Box 2816. [6655

ONE technical assistant required for work on development of de-icing systems, must have sound aerodynamic background, with some knowledge of aircraft performance and heat transfer. Write, giving qualifications and experience, also stating salary required. Quoting Ref. M.2.—Box 2697. [6671

"A" and "C" engineers, licensed on Viking and Hercules "A" are invited to apply for appointments with a well-established company operating on Bovingdon Airport. Good conditions. Salary £800-£950 p.a. Additional emoluments when flying. Fullest information to Box 308, Allardyce Palmer, Ltd., 109, Kingsway, London, W.C.2. [6670

PLANNING engineers (aircraft) required. Considerable production planning experience and sound knowledge of metal airframe components manufacture essential.—Applications, in writing, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds, stating age, experience and salary required. [6633

TOOL draughtsmen, qualified seniors and juniors required. Varied and interesting projects. Pension scheme. Toolmakers will also be considered for some of the vacancies.—Full details to the Personnel Manager, The Fairey Aviation Co., Ltd., Hayes, Middlesex, quoting Ref. PD/M2. [6641

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SAUNDERS-ROE, Ltd., invite applications from all grades of draughtsmen for employment in their aircraft drawing office at Cowes, and from junior draughtsmen for employment in their helicopter division at Eastleigh (Southampton).—Write, stating age, qualifications, experience and salary required, to the Personnel Officer, East Cowes, I.o.W. [0350]

AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd. Applications are invited from senior and junior draughtsmen, and stressmen, for work on this interesting programme.—Write, giving details of experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Luton, Beds. [0595]

H. M. HOBSON, Ltd., Fordhouses, Wolverhampton, require technical assistants for research and development work on fuel metering, and hydraulic servo systems for aircraft, and interesting new projects. Applicants should be up to degree standard in engineering. Staff hostel accommodation available for single applicant. [0592]

H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [0420]

DRAUGHTSMEN with experience in high quality light mechanical or hydraulic engineering are required by progressive Midland manufacturing company. Positions with good prospects are available to younger men. Salaries will be in accordance with age, qualifications and experience. State details, together with salary required, to Box 2705. [0625]

APPLICATIONS are invited from senior and intermediate design draughtsmen: experience of aero engine design desirable but not essential. Please write, stating age and giving details of previous experience in chronological order, to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0449]

HANDLEY PAGE, Ltd., have a vacancy for a technical author for work in connection with the preparation of maintenance manuals, pilots' notes, technical publications, etc. Previous experience in this type of work preferable. Write, stating age and full details of experience, to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [0536]

THE Supermarine Works of Vickers-Armstrongs, Ltd., at their Winchester Design Offices require instrumentation engineers for interesting work on high-speed aeroplanes. Qualifications preferred: engineering degree, with knowledge of electronics, and practical workshop experience.—Apply, Personnel Department, Hursley Park, near Winchester. [0690]

JET engine or ram jet combustion technicians with good aero or thermodynamic knowledge required. Must have sound academic training, have had experience in the analysis of component performance from test results and be capable of assessing performance of projected designs. Write, giving qualifications and experience, also stating salary required. Quoting Ref. M.3.—Box 2639. [0673]

THREE technical assistants of graduate standard required for development work on fuel systems for ram jets. Must have sound knowledge of hydraulics and be capable of drawing up test schedules co-operating in running of tests, and analysing the results. Knowledge of aerodynamics an advantage. Write, giving qualifications and experience, also stating salary required. Quoting Ref. M.1.—Box 2638. [0672]

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ASSISTANT for Technical Publications Department required for compilation of engine repair instructions. Knowledge of sheet-metal work and welding also an advantage. Must have good general education and be able to write clear, unambiguous instructions.—Write, giving age and details of previous experience to The Personnel Officer, the de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0379]

TECHNICAL assistants required in the Experimental Department. Sound engineering background essential, preferably with experience on gas turbine, I.C. engines and component rig testing, capable of writing a comprehensive report on condition of engines, etc. after test.—Write, stating age, training, experience and salary required, to The Personnel Office, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0353]

ASSISTANT CHIEF DESIGNER required for work on a project of National importance in Greater London area. Knowledge of Servo mechanisms, gyros and other small electrical and hydraulic mechanisms essential. Some experience of instrument design preferable. Salary up to £1,000 p.a. would be paid to suitable applicant. Pension scheme in operation. Box AC.64030, Samson Clarks, 57-61, Mortimer Street, W.1. [0606]

DEVELOPMENT engineers and senior draughtsmen required with experience in light hydraulic controls and/or fuel metering equipment; also 50 station draughtsman for this type of work. The factory is situated in the grounds of a country house and the wages and conditions are excellent. Hostel available. Write: Personnel Manager, Dowty Equipment, Ltd., Arle Court, Cheltenham. [0133]

HANDLEY PAGE, Ltd., have vacancies for senior and junior technical assistants in the mechanical and structural test department at Radlett or Cricklewood. Qualifications should include a degree or Higher National Certificate. Previous experience is desirable but not essential. Write stating age qualifications and details of experience, to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [0678]

DEVELOPMENT engineers required by manufacturers of A.C. and D.C. electrical equipment for aircraft. Applicants should hold at least a Higher National Certificate or preferably an Engineering Degree. The positions are superannuated and give considerable scope to men with adequate experience. Write, giving full details in strictest confidence, to the Employment Officer, Rotax Ltd., Chandos Road, N.W.10. [0695]

A HOUSE (married accommodation) is available for an experienced electronics engineer capable of developing anti-vibration means for electronic equipment. Location is special Labrador factory within 50 miles of London. Starting salary £600-£800 per annum, according to qualifications. Send details of qualifications and experience, mentioning Ref. AH/B, to Personnel Services, English Electric Co., Ltd., 34-39, Gillingham St., London, S.W.1. [0451]

R.A.F. tradesmen. An excellent opportunity awaits you at Airtech, Ltd., Aylesbury and Thame Airport, Haddenham, Bucks. Vacancies exist for skilled fitter/riggers, radar/radio mechanics and electricians on aircraft and component work of great national importance. Excellent pay and conditions, opportunities for considerable bonus earnings. Hostel accommodation for single men.—Apply to Personnel Superintendent at above address or telephone Aylesbury 1123. [0640]

HANDLEY PAGE (READING), Ltd., have vacancies in their design office for senior and junior draughtsmen with aircraft experience. Applicants are stressmen, who should have at least two years' experience and with a degree or Higher National Certificate with endorsements in aeronautical subjects. These positions are progressive and offer excellent opportunities to the right men. Please send full particulars to the Personnel Office, Handley Page (Reading), Ltd., The Aerodrome, Woodley, Reading. [0601]

BRITISH OVERSEAS AIRWAYS CORPORATION offer opportunities of work on modern air liners to the following tradesmen: electricians, instrument mechanics, bench fitters and engine and airframe fitters experienced in the maintenance or overhaul of aircraft and/or components. Rates of pay, 2/10 per hour plus 4½d. per hour provisional bonus. Attractive proficiency pay up to 3d. per hour; 5-day, 44-hour week. Possible shift work. Good pension, sick pay and holiday facilities. —Write or call, Staff Manager, Hut 29, London Airport, Feltham, Middlesex. [0600]

CHIEF DEVELOPMENT ENGINEER required to form a new department for work on small electrical and hydraulic mechanisms. Knowledge of servo and gyro practice is desirable. Applicants must be of British birth with several years' experience of development engineering associated with the aircraft industry. Applicants must be in receipt of a salary of not less than £900 p.a. The post is for employment in the North London area, and is pensionable.—Write full details, qualifications, experience, age, to Box A.C.64035, Samson Clarks, 57-61, Mortimer Street, W.1. [0607]

FLIGHT REFUELLING, Ltd. require a junior stressman and technician for interesting work on experimental aircraft installations. Minimum qualification H.N.C. (Mech.). Previous experience of aircraft component stress analysis desirable but not essential. Commencing salary in the range £400-£500 p.a., according to qualifications and experience. 5-day 44-hour week. Pleasant working conditions. Canteen and sports club. Apply, stating age, qualifications, experience and salary required to Personnel Manager, Tarrant Rushton Airfield, nr. Blandford, Dorset. [0774]

SITUATIONS VACANT

MINISTRY OF CIVIL AVIATION. ACCIDENTS INVESTIGATION BRANCH. Applications are invited to all posts for a Senior Inspector of Accidents and an Investigating Officer. Candidates must be at least 30 years of age on June 1st, 1951. They must be of good general education and personality, and be physically fit for duty at home and overseas.

CANDIDATES for the Senior Inspector post must possess tact and sound judgment with the ability to draft concise and logical reports. They must have had considerable flying experience, including not less than 1,000 hours as pilots in charge. They must hold or have held an Airline Transport or Commercial Pilot's licence (or a pilot's "B" licence together with either a navigator's licence, or an engineer's licence for aircraft maintenance and/or operation). They must also have a sound knowledge of engineering, including experience in the field of aeronautics. The current salary is at the rate of £1,000 per annum, rising by annual increments to £1,160, but these rates are at present under review. Candidates for the Investigating Officer post must be able to compile technical reports and must have had wide experience in the field of aeronautical engineering, including knowledge of aircraft and engines and of airline maintenance up to the standard of a "B" or "D" aircraft maintenance engineer's licence. Flying experience will be an advantage. The current salary is at the rate of £500 per annum, rising by annual increments to £550 per annum, but these rates are at present under review.

APPLY by postcard, stating for which post application is made, for application form and further details, to Ministry of Civil Aviation, Est. 1a/AIB, Lacon House, Theobalds Road, London, W.C.1, quoting reference Est. 1a/AIB. Latest date for the receipt of completed application forms is August 30th, 1951, but applications from overseas candidates may be in the first instance by letter, provided full details of qualifications and experience, and date of birth are given. [0394]

SITUATIONS WANTED

EX-R.A.F., 29, seeks position ferry staff pilot, 1,200 hours. Anything considered.—Box 2335. [0660]

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PILOT (commercial Licence and instrument rating, working for A.L.T.P. Licence), 1,000 hours, age 27, Oxford Honours M.A. (Economics and Statistics), commercial and administrative experience, seeks position with prospects.—Please reply to Box 2632. [0677]

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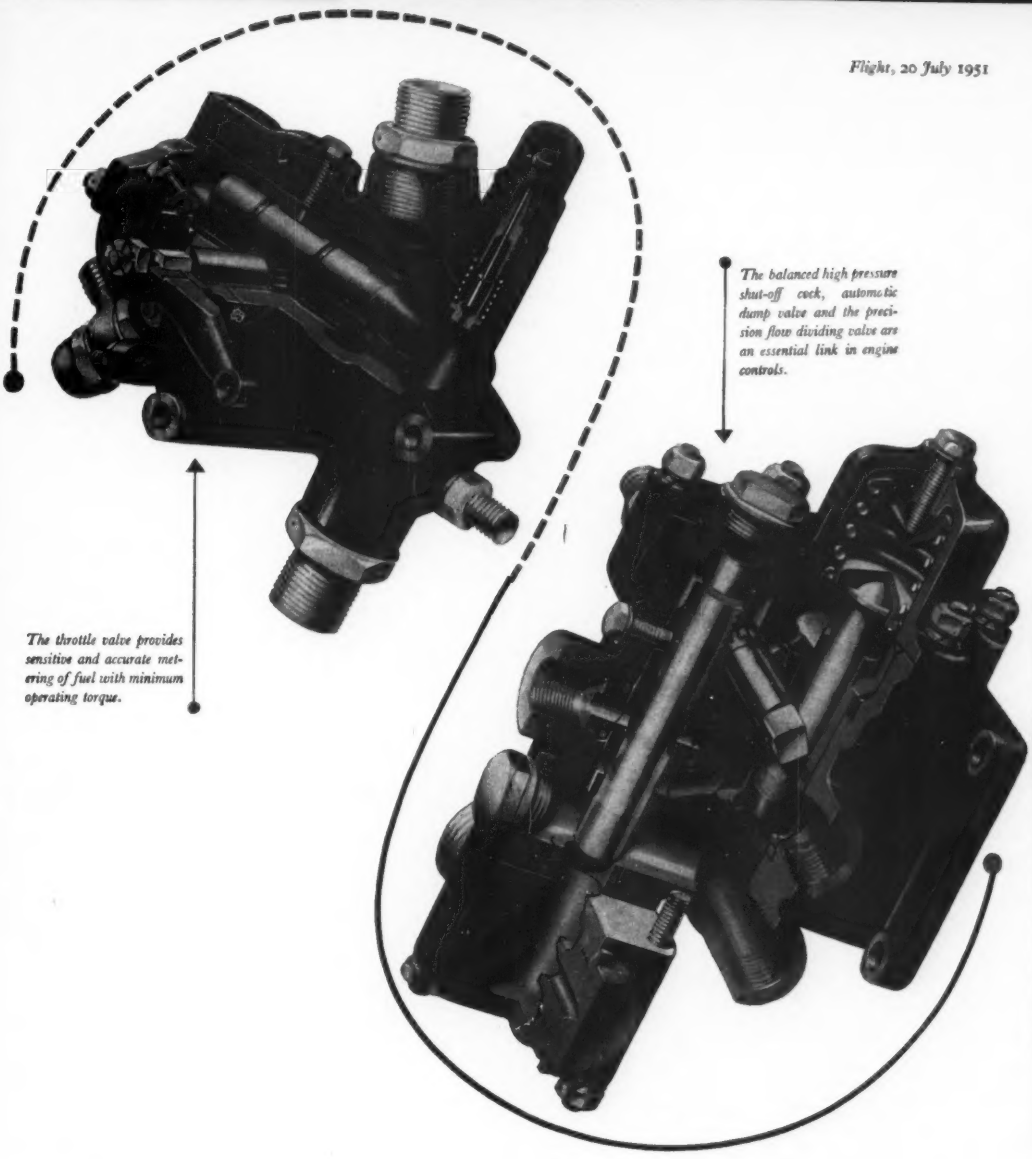

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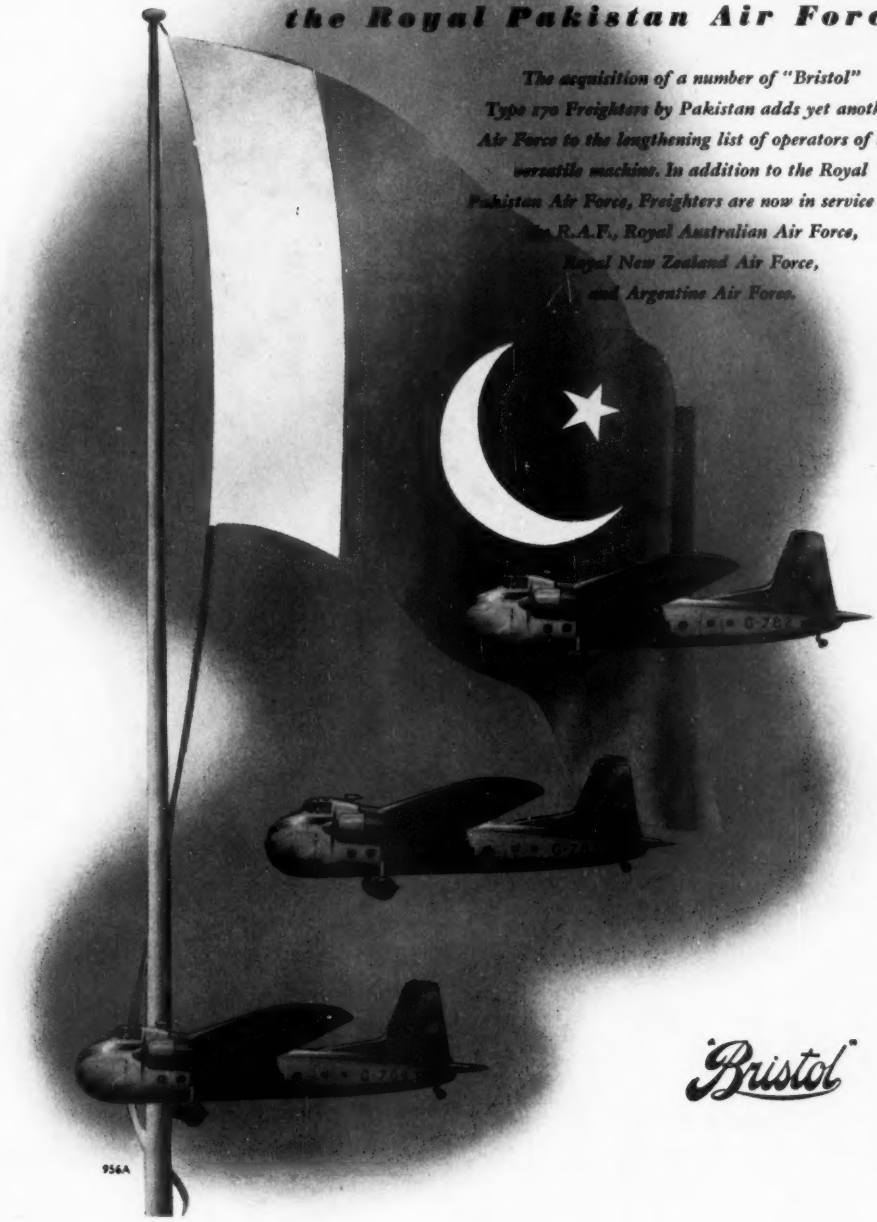

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